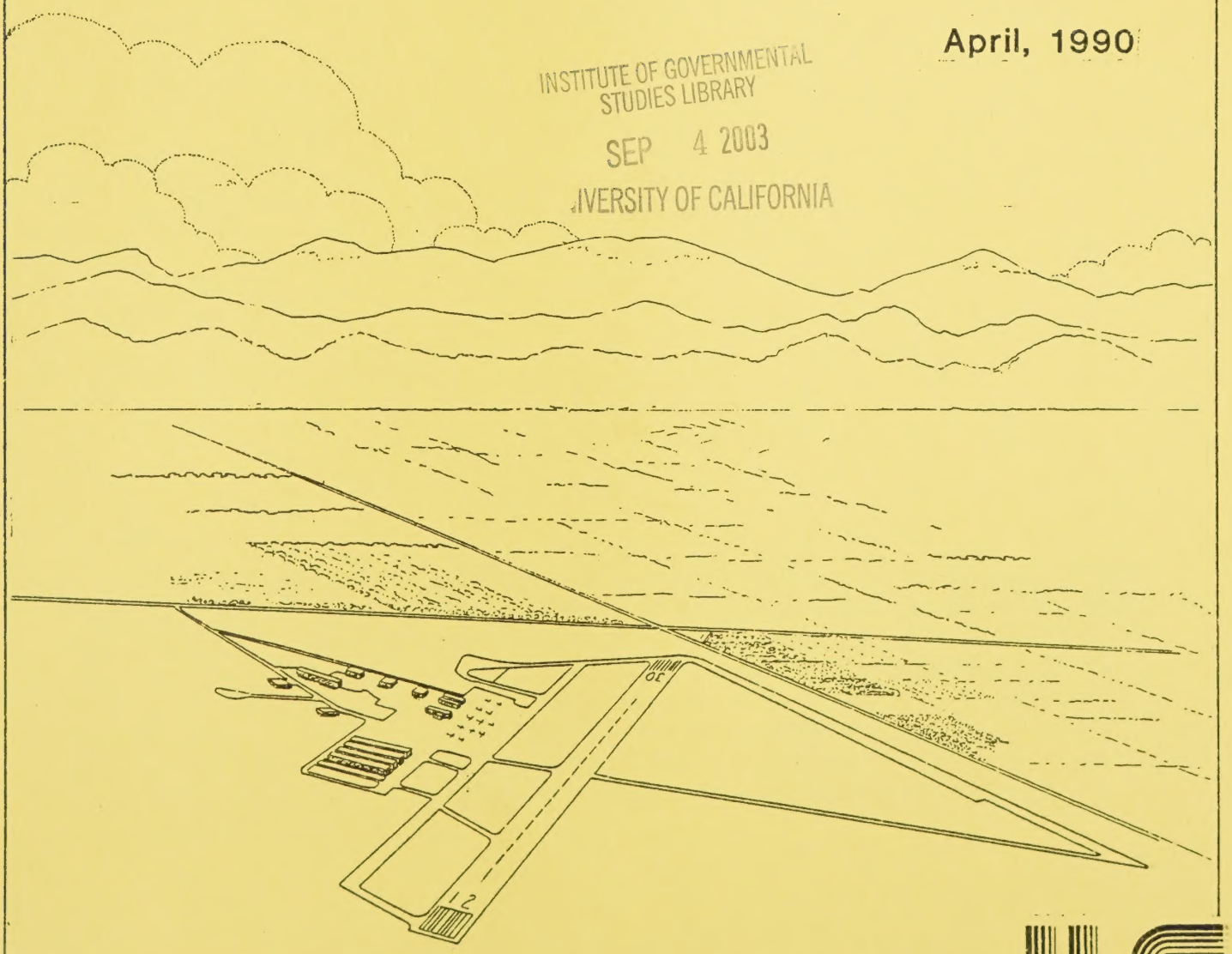
Porterville Municipal Airport Master Plan Report

Porterville, California

April, 1990



HODGES & SHUTT

CITY OF PORTERVILLE

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Nero Pruitt	Council Member
Boyd Leavitt	Council Member
John Gifford	Council Member
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The preparation of this document was financed in part through a planning grant from the Federal Aviation Administration as provided under Section 505 of the Airport and Airway Improvement Act as amended. The contents of this report reflect the views of Hodges & Shutt, who are responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policy of the FAA. Acceptance of this report by the FAA does not in any way constitute a commitment on the part of the United States to participate in any development depicted herein nor does it indicate that the proposed development is environmentally acceptable in accordance with Public Laws 91-190, 91-258, and/or 90-495.

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PART I

Summary

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Introduction

1

INTRODUCTION

STUDY BACKGROUND

The City of Porterville, under a grant from the Federal Aviation Administration (FAA), retained Hodges & Shutt in October 1987 to prepare a comprehensive Master Plan for the long-term development of the Porterville Municipal Airport. During the development of the Airport Master Plan, Hodges & Shutt has had continuing interaction with the Finance Department staff and the Airport Operations Supervisor. The Porterville City Council hosted the public workshops and provided important direction in the formulation of the Plan. Coordination has been maintained with the Porterville Planning Division throughout the study.

CONTENTS OF THE PLAN

The Master Plan Report is organized into two major parts plus a set of appendices.

Part I contains a summary of the Plan. Following this introductory chapter are two chapters which present the major results of the Master Plan study. Chapter 2 sets forth the study's conclusions and recommendations and Chapter 3 contains the airport plan drawings.

Part II consists of the study's technical data and analyses. The are seven principal subject areas:

- Background and inventory data
- Assessment of the airport role and development policies
- Forecasts of airport activity
- Airfield design issues
- Development of the building area
- Land use and environmental issues
- Management and financial topics

The appendices contain miscellaneous supporting information.

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Conclusions and Recommendations

2

CONCLUSIONS AND RECOMMENDATIONS

This chapter summarizes the major findings, conclusions and recommendations contained in the Plan. Parenthetical notes direct the reader to the appropriate chapters from which the summaries are derived.

PLAN ADOPTION

- The Porterville Municipal City Council should adopt this Airport Master Plan as the basis for future development of the Porterville Municipal Airport. The Plan should be reviewed and, as necessary, updated every five to seven years.

AIRPORT ROLE (Chapter 5)

- Five alternative futures were evaluated for plausibility and airfield design implications:

  - Continuation of current uses
  - Expansion of the Air Attack Base
  - Establishment of airline service
  - Development of cargo service
  - Establishment of regionally-oriented fixed base operations

- The most probable future for the Porterville Municipal Airport is a continuation of the current pattern of use, with a modest increase in the number of corporate turboprop and turbofan aircraft. However, limited passenger service by a commuter airline is possible near the end of the 20-year planning period.

AIRPORT DEMAND AND CAPACITY (Chapter 6)

Current Activity

- Based upon discussions with the Airport Operations Supervisor, staff from the fixed base operations, and other airport users, the 1988 activity level is estimated to be 30,000 annual operations.

- The current number of based aircraft is 84.

Forecasts

- The number of aircraft based at the Airport will increase to approximately 150 by the year 2008 if adequate facilities are available.

- Approximately 50,000 operations are forecasted to be conducted in 2008.

Capacity

- Current runway capacity is calculated to be approximately 200,000 annual operations.

- Current radar coverage only extends down to 4,000 feet MSL. This effectively limits the number of instrument operations to approximately six per hour.

AIRFIELD DESIGN (Chapter 7)

- The cost of reactivating Runway 7-25 (at least $150,000) was judged to exceed the potential benefits.

- It is recommended that the City retain the option of developing a taxiway along the course of the closed runway (Runway 7-25).

- The current length of Runway 12-30 (6,000 feet) is adequate to accommodate the range of aircraft anticipated to regularly use the Airport through the 20-year planning period. However, the necessary property should be acquired to retain the option of eventually extending the runway 2,000 feet.

- The current FAA standard for safety areas for Transport runways is 1,000 feet beyond the end of the runway. Presently only approximately 500 feet is available beyond each end of the runway. FAA guidelines permit the continued use of runways which do not meet current safety area standards, if the runways were constructed prior to adoption of the standard -- which is the case at Porterville Municipal Airport. Meeting the current standard would require closure or relocation of two County roads. The cost is judged to exceed the potential benefits and it is recommended that the existing safety area dimensions be retained.

- It is not anticipated that the Airport will qualify for installation of a precision instrument approach during the 20-year planning period. However, the City should acquire sufficient property to retain the option of installing the required equipment.

- Current information suggests that Porterville Municipal Airport will receive one of the FAA's Automated Weather Observing Stations (AWOS) within the next two years. This AWOS will provide 24-hour clock weather information for pilots using the airfield.

BUILDING AREA DEVELOPMENT (Chapter 8)

Aviation-Related Uses

- The wingtip clearance requirement for the parallel taxiway is 106 feet from the taxiway centerline to the nearest parked aircraft. Eighteen tiedown positions on the main apron are currently located within this setback. It is recommended that the City eliminate these tiedown positions.

- 45 new hangars and 17 additional tiedown positions will be needed by 2008. Some of the forecast demand for hangar sites can be accommodated in the leaseholds to which taxilanes were recently extended. Additional sites should be created in the triangle of land east of the existing hangar sites.

- The current number of operations by transient helicopters is great enough to warrant construction of a public helipad. A site adjacent to the transient apron has been designated which would accommodate two helicopters.

- An additional helipad site has been designated adjacent to the fire attack base. This helipad would be constructed by the agencies which use the base and would be reserved for their use.

- A fencing and gate plan has been developed for the airport. The intent is to incrementally increase the level of security at the Airport while maintaining convenient access for pilots and other airport users.

Nonaviation Uses

- Sufficient land has been reserved in the core area to permit expansion of the restaurant and associated terminal uses.

- East of the terminal, a site has been designated for a motel or similar high-visibility use which would be supportive of the Airport's aviation role.

LAND USE COMPATIBILITY (Chapter 9)

- The limited amount of existing development surrounding the Airport presents a major opportunity to avoid the creation of incompatible uses, such as have plagued other airports. There are several steps that should be taken to assure long-term compatibility. The current slow pace of development and low residential densities permitted reduce the urgency of these actions, but not their importance.

- Noise contours were developed for both the existing and projected future activity levels. The current 55 CNEL noise contour extends almost one mile northwest and approximately 1,000 feet southeast of the Airport. Growth in operations will extend the

contours to the to the southeast while reducing them to the northwest. This seemingly paradoxical change is linked to the forecast change in the fire tanker aircraft used. The quieter Lockheed Hercules (C-130) is expected to replace the DC-6's and -7's which are currently being used. It should be noted, however, that in common with other general aviation airports with moderate activity levels, noise contours are relatively poor predictors of where individuals will be disturbed by airport-related noise.

- The current land use designations for the land within one mile of the runway should be retained. Where possible, further subdivision of land within this area should be prevented.

- Porterville Municipal's existing Airport Height Combining Zone should be updated to reflect the Part 77 surfaces contained in the Approach and Clear Zone Plan which is a part of this report.

- Land within the future clear zones should be acquired in fee simple. A separate fund should be established within the Airport's budget for this purpose. It may be possible to acquire some of this land by trading the surplus Airport lands (designated on the Airport Layout Plan). This would reduce the acquisition costs to those required to process the land trade (e.g., surveying and administration).

MANAGEMENT AND FINANCE (Chapter 10)

- In order for Porterville Municipal to implement the Capital Improvement Program (Table 10) contained in this report, it is necessary that the Airport's revenue-generating capacity be maximized. The proposed Capital Improvement Program totals $3 million over the projected ten-year period. Assuming Federal and State grants are used wherever possible, the City's share over this period will be $300,000.

- The figures set forth in the Pro Forma Financial Project (Table 11) indicates that Porterville Municipal Airport is capable of generating a modest net operating income throughout the 10-year forecast period.

3

Airport Plans

3

AIRPORT PLANS

OVERVIEW

An Airport Layout Plan (ALP) is a graphic representation of the airport owner's intentions regarding the future course of airport development. The Federal Aviation Administration (FAA) requires the airport sponsor to have an adopted ALP in order to be eligible for funding under the FAA Airport Improvement Program. A current ALP is also required by the State of California to qualify for funds from the California Aid to Airports Program.

AIRPORT LAYOUT PLAN DRAWINGS

As presented in this section, the Porterville Municipal Airport Plan consists of a set of two drawings prepared in accordance with the guidelines set forth in FAA Advisory Circular 150/5070-6, "Airport Master Plans". The principal drawing, illustrating the overall configuration of the Airport, is the Airport Layout Plan (ALP) itself. A current ALP is required to be eligible for grants from the Federal Aviation Administration Airport Improvement Program and California Aid to Airports program. The purpose of the Approach and Clear Zone Plan is to protect the airspace essential to the safe operation of aircraft in the vicinity of the Airport. The criteria which define the limits of this airspace are established in Federal Aviation Regulations (FAR) Part 77, "Objects Affecting Navigable Airspace."

Airport Layout Plan

The Airport Layout Plan drawing (Figure 1) shows the existing and ultimate development of the Airport. Pertinent clearance and dimensional information, as needed to show conformance with applicable airport standards, are indicated. Other relevant airport data are shown in a tabular form.

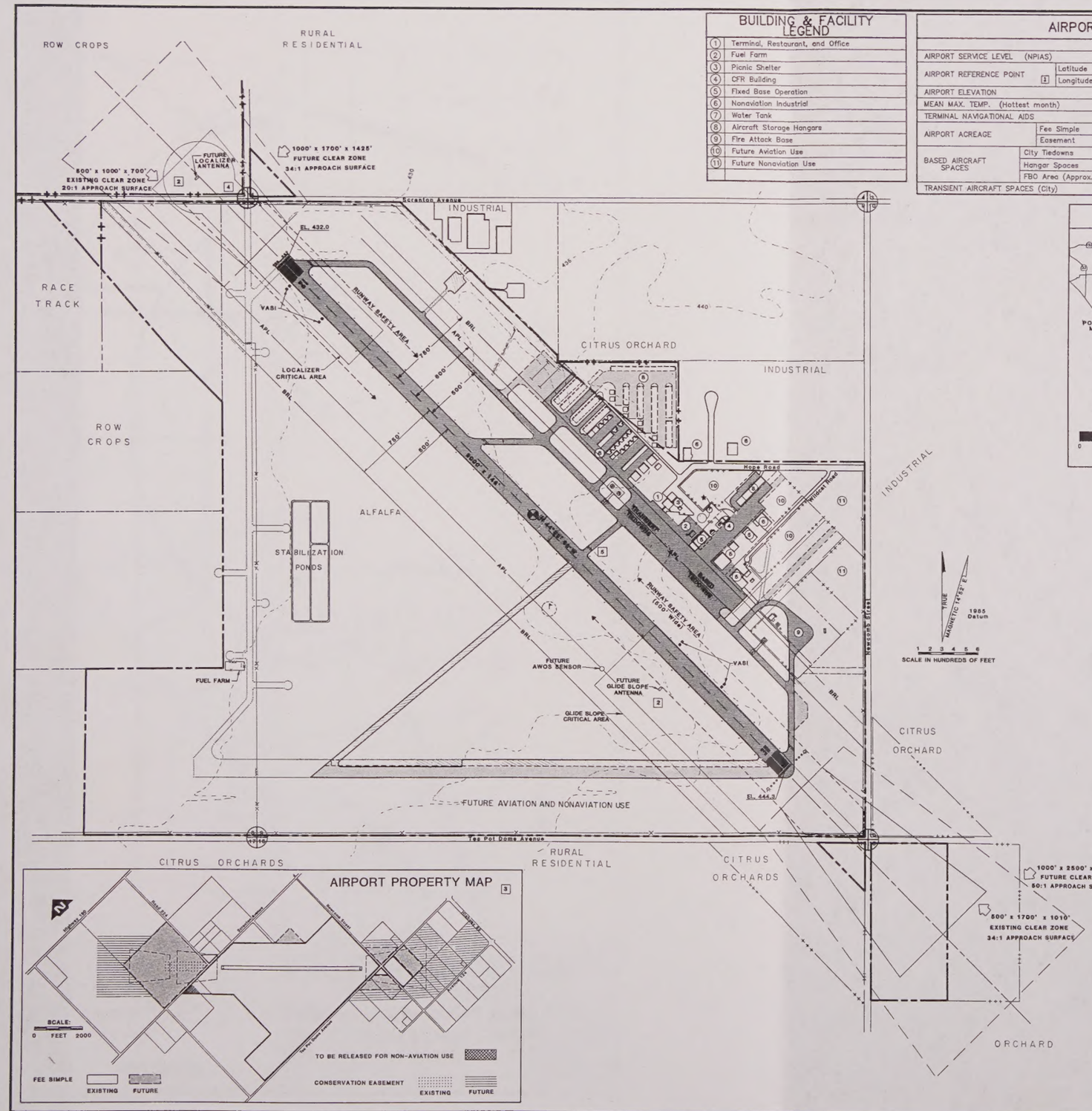
Approach and Clear Zone Plan

The Approach and Clear Zone Plan (Figure 2) presents both plan and profile views of the airspace associated with the Porterville Municipal Airport. The dimensions of the Part 77 surfaces are based upon a future runway length of 8,000 feet and a precision approach to Runway 30.

MAJOR FEATURES OF THE PLAN

The major elements of Porterville Municipal Airport's airfield (i.e., runway, parallel taxiway and main apron) are expected to continue to meet the needs of the Airport's users through the next 20 years. Therefore, the Airport Master Plan focuses on refinements to the facility and retention of options. The principal features of the Plan include:

- Provision for extending Runway 12-30 2,000 feet to the northwest.
- Sites for future aircraft storage hangars.
- Leaseholds for additional fixed base operations with separate areas for large and small aircraft.
- Definition of the land which should be retained for aviation uses.
- Sites for parking transient helicopters.
- Designation of a portion of the abandoned runway (Runway 7-25) for future use as a taxiway.



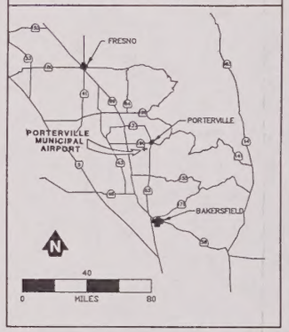
BUILDING & FACILITY LEGEND

1	Terminal, Restaurant, and Office
2	Fuel Farm
3	Picnic Shelter
4	CFR Building
5	Fixed Base Operation
6	Nonaviation Industrial
7	Water Tank
8	Aircraft Storage Hangars
9	Fire Attack Base
10	Future Aviation Use
11	Future Nonaviation Use

AIRPORT DATA

		EXISTING	FUTURE
AIRPORT SERVICE LEVEL (NPIAS)		GENERAL AVIATION	SAME
AIRPORT REFERENCE POINT [1]	Latitude	36° 01' 47"	SAME
	Longitude	119° 03' 43"	SAME
AIRPORT ELEVATION		444.0	SAME
MEAN MAX. TEMP. (Hottest month)		99.2° F	SAME
TERMINAL NAVIGATIONAL AIDS		VOR	SAME
AIRPORT ACREAGE	Fee Simple	607	813
	Easement	19	379
BASED AIRCRAFT SPACES	City Tiedowns	45	62
	Hangar Spaces	38	83
	FBO Area (Approx.)	20	30
TRANSIENT AIRCRAFT SPACES (City)		15	18

VICINITY MAP



RUNWAY DATA

		RUNWAY 12 – 30 EXISTING	RUNWAY 12 – 30 PROPOSED
RUNWAY CLASSIFICATION		Transport	Transport
PHYSICAL LENGTH AND WIDTH		6000' x 146'	SAME [2]
EFFECTIVE GRADIENT		0.020%	SAME
PAVEMENT STRENGTH (1000#) S/D/DT		30/70/110	30\90\125
APPROACH TYPE	12	Visual	Non-precision
	30	Non-precision	Precision
APPROACH SLOPE: REQUIRED/CLEAR	12	1:20/1:18	1:34
	30	1:34/1:24	1:50
APPROACH AND LANDING AIDS	12	VASI	SAME
	30	VASI,REIL	ILS/MLS [2]
CRITICAL AIRCRAFT	Runway Length	DC-7	C-130A
	Pavement Strength	DC-7	C-130A
RUNWAY LIGHTING		Medium Intensity	Medium Intensity
TAXIWAY LIGHTING		None	Medium Intensity
RUNWAY MARKING		Non-precision	Precision

DRAWING LEGEND

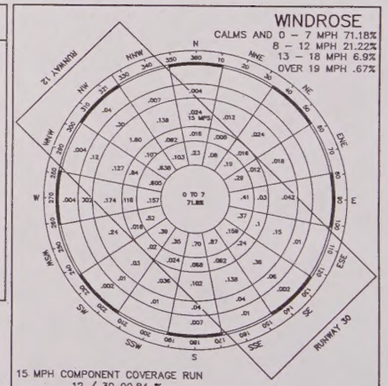
	EXISTING	FUTURE
ACTIVE AIRFIELD PAVEMENT		
ABANDONED AIRFIELD PAVEMENT		
OTHER PAVEMENT IN USE		
GRAVEL SHOULDER/ROAD		
AIRPORT PROPERTY LINE		
LEASE OR RIGHT-OF-WAY LINE		
OTHER PROPERTY LINES		
BUILDING RESTRICTION LINE	BRL	
AIRCRAFT PARKING LIMIT	APL	
BUILDINGS		
BUILDINGS TO BE REMOVED		
FENCE & GATE		
TOPOGRAPHIC CONTOURS		
WATER COURSE & BRIDGE/CULVERT		
HELICOPTER TOUCHDOWN/PARKING		/
AIRFIELD LIGHTS: SINGLE/GROUP/FLASHING	/ /	/ /
WIND CONE		
ROTATING BEACON		
AIRPORT REFERENCE POINT		
SECTION CORNERS		

NOTES

1. RUNWAY END COORDINATES HAVE NOT BEEN SURVEYED, LATITUDE AND LONGITUDE ARE NOT AVAILABLE.
2. PRECISION APPROACH EQUIPMENT REQUIREMENTS TO BE DETERMINED BY FUTURE FAA STUDY.
3. PROPERTY AQUISITION PLAN IS INTENDED TO PRESERVE THE OPTION OF EXTENDING RUNWAY 12–30 8,000 FEET TO THE NORTHWEST.
4. ROADS TO BE CLOSED WHEN LOCALIZER IS INSTALLED.
5. HOLD BARS SHOWN FOR CATAGORY B LARGE AIRCRAFT, NOT AS CURRENTLY MARKED.

WINDROSE

CALMS AND 0 – 7 MPH 71.18%
8 – 12 MPH 21.22%
13 – 18 MPH 6.9%
OVER 19 MPH .67%



15 MPH COMPONENT COVERAGE RUN
12 / 30 99.84 %
SOURCE : U.S. WEATHER STATION FRESNO AIR TERMINAL 9/10/61 TO 9/10/72

SUBMITTED BY:
City of Porterville

APPROVED

Date

APPROVED
FEDERAL AVIATION ADMINISTRATION
AIRPORTS DISTRICT OFFICE
San Francisco, California

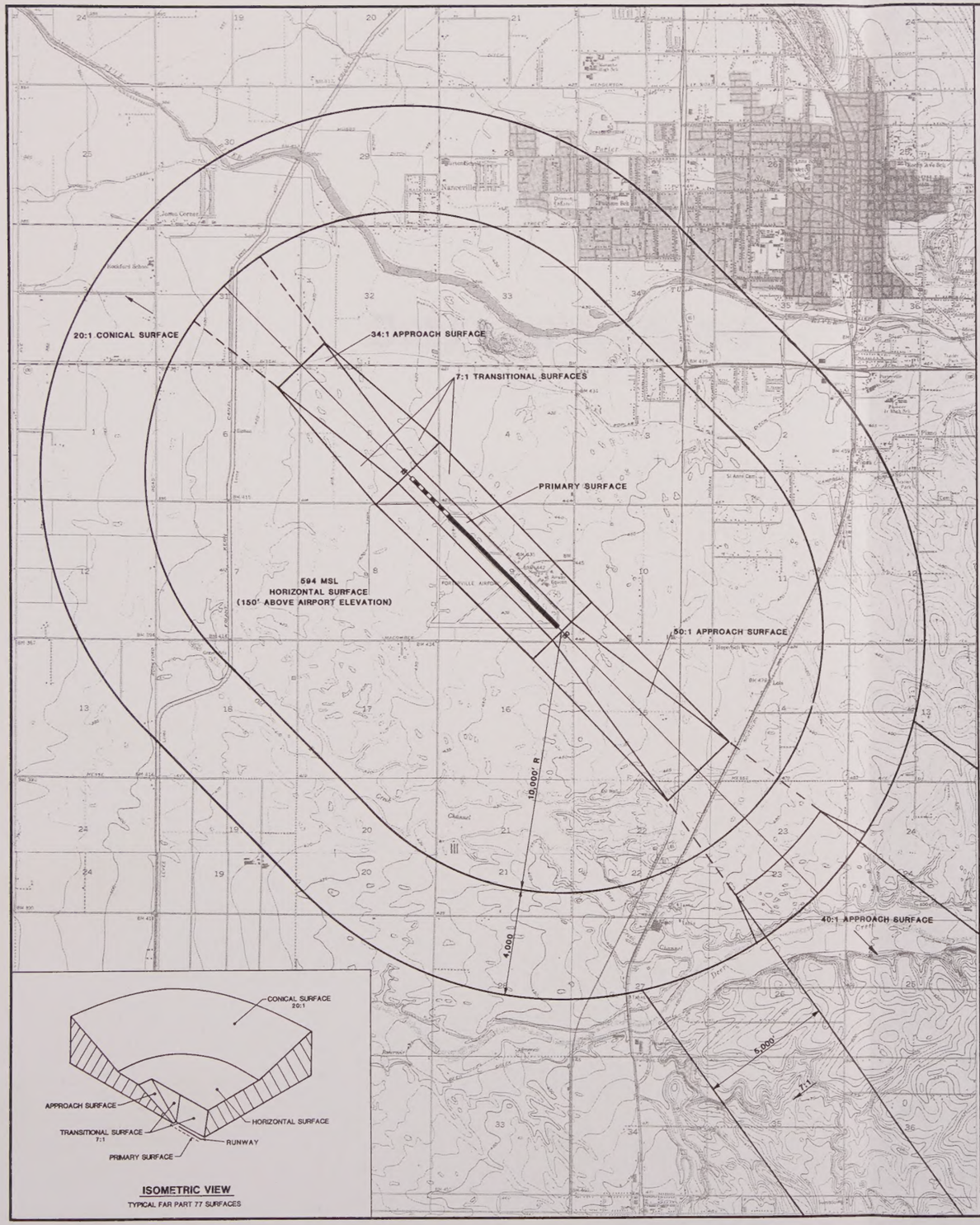
By_____ Date _____
Manager
Subject letter dated _____

NO.	REVISION	BY	APP'D	DATE	MARKS

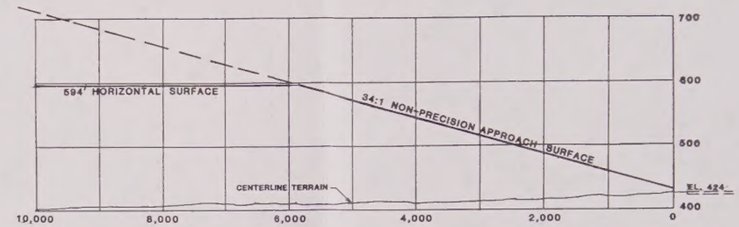
PORTERVILLE MUNICIPAL AIRPORT
PORTERVILLE , CALIFORNIA
AIRPORT LAYOUT PLAN

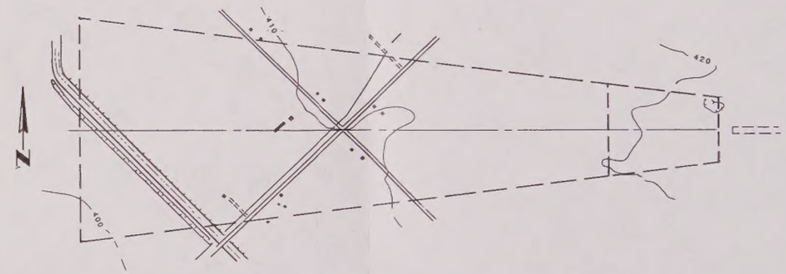
HODGES & SHUTT
AVIATION PLANNING SERVICES
AIRPORT CONSULTANTS & ENGINEERS
Santa Rosa, California

DESIGNED BY:	APPROVED BY:		DATE: SEPT.1988
DRAWN BY:	CHECKED BY:	SCALE: 1"=400'	SHEET: 1 OF 1

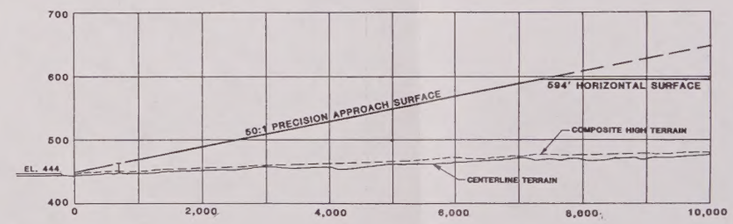


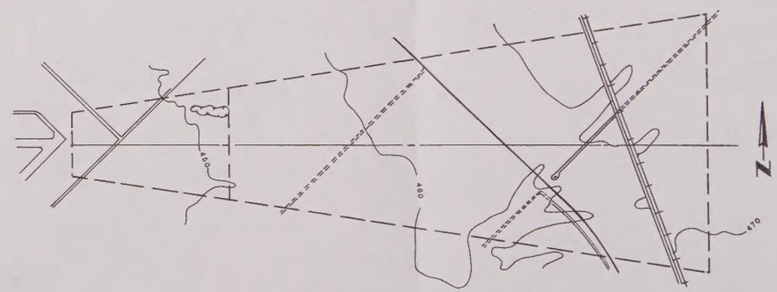
RUNWAY 12

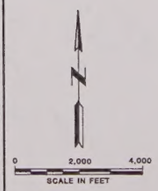




RUNWAY 30







NO.	REVISION	BY	APP'D	DATE	MARKS

PORTERVILLE MUNICIPAL AIRPORT
PORTERVILLE, CALIFORNIA

APPROACH AND CLEAR ZONE PLAN

HODGES & SHUTT
AVIATION PLANNING SERVICES
AIRPORT CONSULTANTS & ENGINEERS
Santa Rosa, California

DESIGNED BY:	APPROVED BY:		DATE: JUNE 1989
DRAWN BY: BE	CHECKED BY:	SCALE: AS SHOWN	SHEET: OF

PART II

Data and Analyses

4

Background and Inventory

4

BACKGROUND AND INVENTORY

COMMUNITY PROFILE

Porterville is a community of approximately 27,000 inhabitants located in south central Tulare County. The city is located within southern San Joaquin Valley, approximately 45 miles north of Bakersfield and 65 miles south of Fresno. Porterville lies at the base of the Sierra Nevada mountains, with portions of the eastern sections of the community extending into the lower foothills.

A community affects an airport located in its vicinity in two ways. The need for aviation facilities and services at an airport is generated by the community which the airport serves. The type of development around an airport shapes (and may limit) how an airport responds to the demand for facilities and services. In turn, an airport effects the community in which it is located. An airport produces economic benefits in the community. Airport activities also have environmental effects upon the airport's surroundings. A general understanding of the community is, therefore, essential to the preparation of an airport master plan.

Agriculture has historically been a major employer in the local economy, especially citrus producing and processing. The service industry is the largest employer, with the Porterville State Developmental Center being the largest single employer. Retail and wholesale trades are significant employers in Porterville, as it serves as a regional trade center for southeastern Tulare County and northern Kern County. There are also several major industrial firms in the community with products as diverse as women's sportswear and business forms.

Table 1 highlights some of Porterville's other existing characteristics and forecast trends.

AERONAUTICAL SETTING

Area Airports

Eleven airports are located within a 25-nautical mile flying distance of Porterville Municipal Airport. Six of these airports are open for public use. Table 2 summarizes selected major features of these airports and Figure 3 shows their location. None of the area airports are located close enough to share required approach and departure airspace with Porterville Municipal. Three airports have facilities and services comparable to those of Porterville Municipal Airport: Delano Municipal, Mefford Field (Tulare), and Visalia Municipal.

Area Airspace

The airspace structure within the vicinity of the Porterville Municipal Airport is relatively uncomplicated (Figure 3). As with the majority of the continental United States, most of the airspace in the vicinity of Porterville Municipal Airport is "controlled airspace" – air traffic in this area is subject to the control of the FAA and required in-flight visibility is greater than for uncontrolled airspace. Locally, uncontrolled

Table 1

COMMUNITY PROFILE

GEOGRAPHY

Location

- Lies within San Joaquin Valley in South Central Tulare County.
- 46 miles north of the city of Bakersfield.
- 64 miles south of the city of Fresno.

Size

- Approximately 10.4 square miles within incorporated city limits.

Topography

- City lies at the base of the Sierra Nevada Mountains.
- Elevation of City ranges from 450-1700 feet MSL.
- The Tule River flows through the community.

SURFACE TRANSPORTATION

Major Highways

- Principal route is Highway 65, a 4-lane divided highway through the center of town.
- Other area route is Highway 190, a 2-lane undivided highway with a direct access to State Highway 99, a major north-south corridor through the Central Valley.

Railroads

- Southern Pacific and Santa Fe railroads provide freight service.

Public Transportation

- The Dial-A-Colt bus provides door-to-door public service.
- Regional service by Orange Belt Stages; connects to interstate bus service in Visalia and Bakersfield.

Trucking

- Two dozen local trucking firms provide agricultural and general freight hauling.

POPULATION AND ECONOMY

Current Population

- Current estimated population of 26,981 within the City of Porterville, 1989 (California Department of Finance). 1970 count was 12,602 and 1980 Census count was 19,692 - a 50% growth.

Projected Population

- Population for the City of Porterville is projected to be 55,000 by the year 2010 (City of Porterville Planning Division).
- Population for Tulare County is projected to be at 470,000 by the year 2010 (Interpolation between Department of Finance forecast for the years 2000 and 2020).

Basis of Economy

- Agriculture, especially citrus production and processing.
- Service industry.
- Retail and wholesale trade - serves as a regional trade center for southeast Tulare County and northern Kern County.
- Major industrial firms.

CLIMATE

Temperatures

• Hottest month (July)	–	average high:	98.5° F.
		average low:	64.6° F.
• Coldest month (January)	–	average high:	56.5° F.
		average low:	36.2° F.

Precipitation and Fog

- Average annual rainfall: 11.6 inches; mostly between October and April.
- Fog: seasonal tule fog often dense; generally from mid-November through February.

Winds

- Prevailing winds from northwest.
- Strong northwest through southeast winds associated with frontal passage during winter.

Table 2

AREA AIRPORTS

	Location						Facilities[3]					Services[4]						
Airport	Community	County	Direction[1]	Owner	Use	Based A/C	Rwys	Long	Surf	Lgt	Appr	Gas	Jet	Mntn	Rent	Food	CT	Psgr
Porterville Municipal	Porterville	Tulare	–	City	PUB	84	1	6000	Asph	Yes	NP	x	x	x	x	x	-	-
Delano Municipal	Delano	Kern	20 SW	City	PUB	55	2	5650	Asph	Yes	Np	x	-	x	x	x	-	-
Eckert Field	Strathmore	Tulare	9 N	Private	PVT	21	1	2000	Asph	No	Vis	x	-	-	-	-	-	-
Gallaher	Tulare	Tulare	19 NW	Private	PVT	0	1	2800	Asph	No	Vis	-	-	-	-	-	-	-
Green Acres	Visalia	Tulare	24 NW	Private	PVT	48	1	2800	Asph	No	Vis	x	-	-	-	-	-	-
Mefford Field	Tulare	Tulare	16 NW	City	PUB	88	1	3900	Asph	Yes	Vis	x	x	-	x	x	-	-
Pixley	Pixley	Tulare	14 SW	County	PUB	11	1	2050	Asph	Yes	Vis	x	-	x	-	-	-	-
Pruner Field	Exeter	Tulare	14 N	Private	PVT	11	1	2350	Asph	No	Vis	x	-	x	-	-	-	-
Salyer Farms	Corcoran	Kings	24 NW	Private	PVT	2	1	7000	Asph	No	Vis	-	-	-	-	-	-	-
Sequoia Field	Dinuba	Tulare	15 NE	County	PUB	30	1	3012	Asph	Yes	Vis	x	-	x	-	-	-	-
Visalia	Visalia	Tulare	25 NW	City	PUB	192	1	6559	Asph	Yes	Prc	x	x	x	x	-	-	x
Woodlake	Woodlake	Tulare	24 N	Private	PUB	30	1	3320	Asph	Yes	Vis	x	-	-	-	x	-	-

[1] Distance (in Nautical Miles) and Direction from Porterville Municipal Airport

[2] 1987 California Division of Aeronautics data

[3] Facilities:
- Rwys = Number of Runways
- Long = Length of Longest Runway (feet)
- Surf = Runway Surface (concrete/asphalt/turf/dirt)
- Lgt = Runway Lighted (yes/no)
- Appr = Approach Type (precision/nonprecision/visual)

[4] Services:
- Gas = Aviation Gasoline
- Jet = Jet Fuel
- Mntn = Aircraft Maintenance
- Rent = Aircraft Rental
- Food = Restaurant
- CT = Air Traffic Control Tower
- Psgr = Scheduled Passenger Airline Service

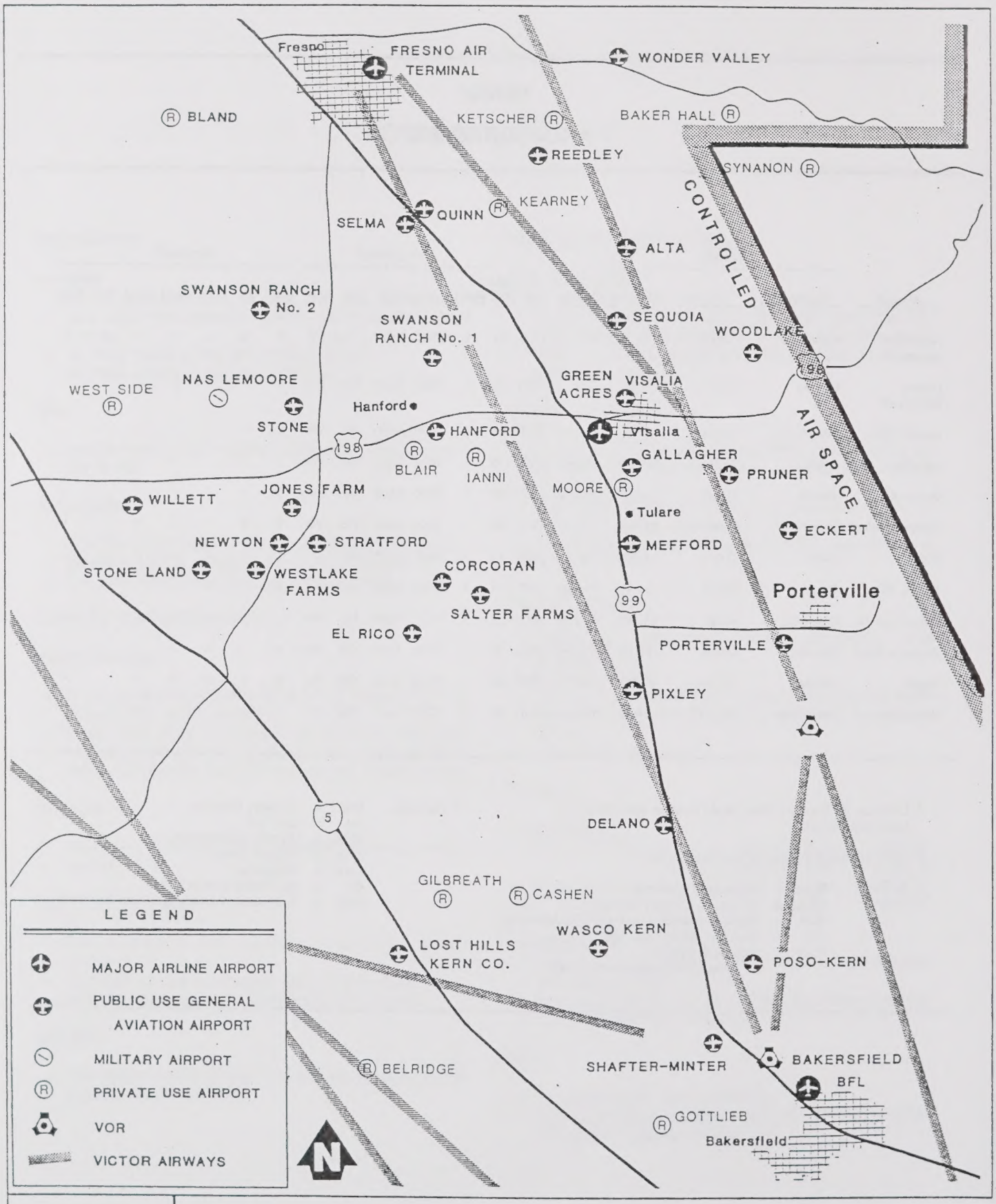


FIGURE 3

AREA AIRSPACE

HODGES & SHUTT

airspace begins approximately 13 nautical miles to the east.

In most of the surrounding region, controlled airspace begins at 1,200 feet above ground level (AGL). At Porterville Municipal Airport, a transition area extending to the southeast enables a pilot to remain within controlled airspace as he descends for an instrument approach to the Airport. This transition area extends to 700 feet AGL.

Also of importance in a airport master plan study are the interrelationships between the subject airport and nearby airports and airspace. Such interrelationships can be significant with regard to the marketing and demand for aviation facilities and services, as well as in terms of air traffic control and other technical matters.

One low altitude Victor Airway passes immediately west of the Airport: Victor 165-459. Seven miles to the southeast, at the Porterville VOR, this combined airway splits – Victor 165 turns to the south, while Victor 459 continues to the southeast. These airways provide defined routes that can be flown under instrument conditions. The minimum enroute altitude on Victor 165-459 is 3,500 feet.

PORTERVILLE MUNICIPAL AIRPORT

Location and Environs

The Porterville Municipal Airport is located approximately three miles southwest of Porterville's city center (Figure 4). The Airport is one mile west of State Highway 65 and one mile south of State Highway 190. The airport property is an incorporated, but noncontiguous, piece of the City of Porterville. The lands to the north and east are within Porterville's designated urban area boundary. Currently, however, all of the surrounding lands are under the jurisdiction of Tulare County

A thorough inventory of existing airport features, including facilities, services, and surroundings, is an essential preliminary step in the Master Plan study. Key features are highlited in the adjacent paragraphs. Additional details are provided in accompanying figures and tables.

The land uses in the surrounding area are principally agricultural, with citrus crops predominating. Immediately east of the Airport is a small group of industrial buildings. An off-highway raceway and several industrial uses are located on city-owned leaseholds adjacent to the airfield. Small groups of single-family homes on five- to ten-acre lots are located in widely-scattered pockets north, east, and south of the Airport. Other information about the Airport's surroundings is listed in Table 3.

Airport Development

The most conspicuous feature of Porterville Municipal Airport is the 6,000-foot long runway. The airfield was originally constructed under the Defense Landing Area Program for the Army as a flight training facility. The origins of the airfield are not immediately apparent because of the considerable development which has occurred since the airfield was returned to civilian use in 1948. A profile of the Airport is presented in Table 3. A more detailed inventory of existing airport facilities is contained in Appendix A.

Management and Services

Management of Porterville Municipal Airport is under the authority of the City of Porterville Department of Finance. Day-to-day on-site

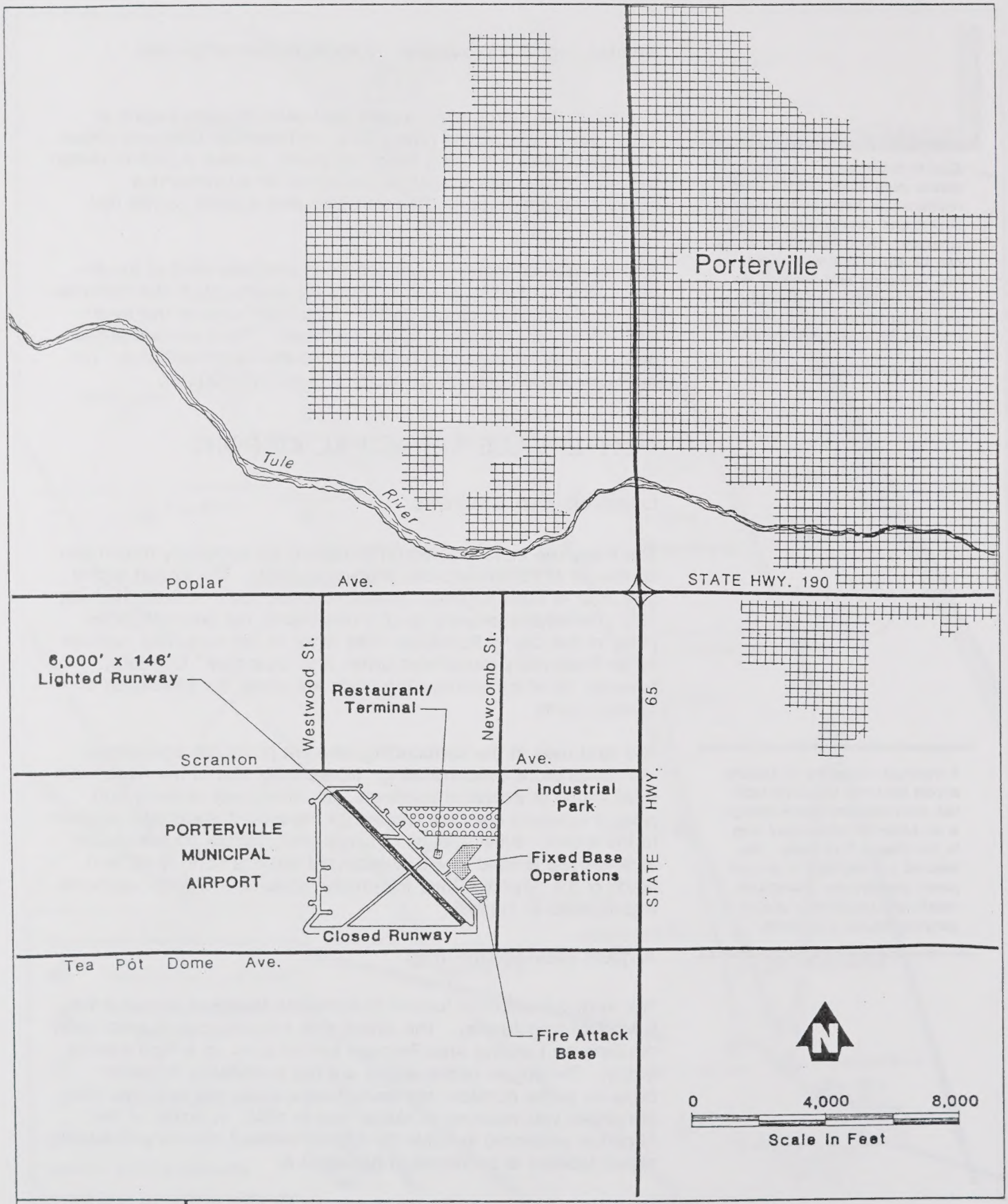


FIGURE 4

AIRPORT ENVIRONS

HODGES & SHUTT

Table 3

PORTERVILLE MUNICIPAL AIRPORT PROFILE

MAJOR FEATURES

Property
- 610 acres owned by City of Porterville encompasses airfield and building area.
- 18-acre avigation easement in approach to Runway 12 owned by City.

Airfield
- Runway 12-30 – 6,000-feet long, 146 feet wide; paved; lighted.
  - 4-box VASI.
- Parallel taxiway runs full length of runway.

Building Area
- Aircraft Parking:
  - 52 tiedowns.
  - 5 T-hangars.
- Aviation-Related Buildings:
  - 4 maintenance hangars with office.
  - 7 hangars.
  - 13 portable hangars.
  - 13 shade hangars.
- Restaurant

AIR TRAFFIC PROCEDURES

Traffic Pattern
- Pattern Altitude – 1,000 feet above airport elevation.
- Standard left-hand pattern.

Instrument Approaches
- Non-precision Instrument Approach to Runway 30.

MANAGEMENT AND SERVICES

On-Site Management
- Management provided by the Director of Finance with guidance from the City council.
- Airport Operations Supervisor and staff provide maintenance, operate Unicom, etc.

Fixed Base Operations
- 2 full-service operators.
- 3 limited-service operators.

Fuel Service
- Provided by City of Porterville.

Emergency and Security
- On-site crash/fire facility.
- On-site security by operations staff.
- City police patrol on random basis; emergency response time is 3-5 minutes.

ENVIRONS

Topography
- Airport Elevation – 444 feet MSL.

Access
- Eastside access from Hope Road via Newcomb Street.

Jurisdictions
- Airport property is noncontiguous, incorporated part of the city of Porterville.
- All surrounding lands within jurisdiction of county of Tulare.

Principal Land Uses
- North – Agricultural, rural residential.
- East – Agricultural.
- South – Agricultural, rural residential.
- West – Industrial and agricultural.

operation of the Airport is provided by the Airport Operations Supervisor and one supporting staff. Major policy decisions are the responsibility of the City Council

A *fixed base operation* is a business operating at an airport that provides aircraft services to the general public, including but not limited to sale of fuel and oil; aircraft sales, rental, maintenance, and repair; parking and tiedown or storage of aircraft; flight training; air taxi/charter operations; and specialty services, such instrument and avionics maintenance, painting, overhaul, aerial application, aerial photography, aerial hoists, or pipeline patrol.

Five fixed base operators (FBO's) are located at the field. Between them they provide all of the services needed at a general aviation airport. Table 4 lists the FBO's and notes the services that each provides.

Navigation and Communication Facilities

A nonprecision instrument approach is currently available using the Porterville VOR. The two most important communications facilities for operations at Porterville Municipal Airport are the Unicom (operated by the City) and the Bakersfield Approach Control (operated by the FAA). The Unicom is monitored 8 a.m. to 6 p.m. Bakersfield Approach Control is operated 24 hours per day. Table 5 summarizes this information and provides supplemental information on navigation facilities.

PREVIOUS PLANS AND STUDIES

Two previous Airport Master Plans have been prepared for the Porterville Municipal Airport. The most recent Airport Master Plan was prepared by Compton & Associates and adopted by the city in December 1973. The access road and aircraft parking apron improvements which were subsequently constructed followed the layout presented in this Plan. Hangar construction, however, did not follow the curved arrangement shown in the plan. Instead, the existing linear arrangement was continued.

The first Airport Master Plan, prepared by Quinton Engineers, was adopted by the city of Porterville in 1947, a year before the Federal Government release the facility to the city. A copy of this report was not available during the development of the current master plan. However, in the 1973 plan it was stated that, "Little work has been accomplished since [the original] plan was adopted."

Table 4

FIXED BASE OPERATIONS SERVICES

Name	Fuel				Aircraft Rent/Chartr		Flght Inst-ructn	Aircraft Sales		Aircraft Maintenance					Air-craft Parts	Storage Space		Pilot Loung	Other
	80	100	100LL	Jet	Fixed Wing	Heli-coptr		New	Used	Eng-ine	Air-frame	Avi-onics	Heli-coptr	Misc.		Hngr	Ramp		
City of Porterville	X		X	X												X	X	X	
Arrow Falcon Exporters										X[1]	X[1]								
Del-Air Porterville					X		X			X	X[2]				X				X[3]
Porterville Aviation					X		X			X					X				X[3]
Ray's Aircraft										X[4]	X[4]								
Troupe Enterprises										X[5]	X[5]								

1 Helicopters only
2 Specializing in restoration
3 Pilot's supplies
4 Especially Cessna 195 restoration/maintenance
5 Helicopter rebuilding

Table 5

AIR NAVIGATIONAL FACILITIES

Air Traffic Control Services:

Enroute Traffic Control	Los Angeles ARTCC
Approach Control	Bakersfield Approach Control
Local Traffic Advisories	Porterville Unicom
Flight Service Station	Bakersfield

Navigational Aids:

Off-Airport VOR/DME (Porterville)

Visual Approach Procedures

Standard, left-hand pattern – both runways
Pattern Altitude: 1,444 feet MSL[1] (1,000 feet AGL[2])

Published Instrument Approach Procedures:

	Weather Minimums	
Approach Procedure[3]	Ceiling (AGL)[4]	Visibility (Statute)
VOR Runway 30	496 feet[5]	1 mile

[1] Mean Sea Level

[2] Above Ground Level

[3] Straight-in Approach

[4] Assumes use of Bakersfield altimeter setting

[5] With DME; 616 feet without DME

5

Airport Role

5

AIRPORT ROLE

PRESENT

As is typical of the public-use, general aviation airports serving growing communities across the county, Porterville Municipal Airport has all of the basic services and facilities required to support business and personal aviation uses. The primary aeronautical role which this type of airport plays is as a general aviation access point to its community. This access role consists of three principal functions:

- A base for aircraft owned by local residents and businesses – The proximity of the Airport to town is a significant advantage to aircraft owners who do not need the additional facilities and services of the more distant Meadows Field.

- Air travel arrival and departure points for people visiting the community, whether for recreational purposes, company or personal business – The availability of the airfield should be counted as an important component of the City's economic diversification efforts.

- A place where emergency or relief services can reach the community by air – If a major earthquake severed the roads providing access to the city, Porterville Municipal Airport could become the best means of reaching the area. Even under less cataclysmic circumstances, the speed of air transportation through the local airport can be critically important when a prompt response to an emergency is necessary.

In addition to its role as an aviation access point, Porterville Municipal Airport has several secondary roles many of which are common to community airports:

- An on-airport site and marketplace for local businesses and commercial enterprises to provide aviation-related services – The five fixed based operations provide direct employment for over 30 people.

- An uncongested site for transient flight-training activities – Porterville's runway length, parallel taxiway, uncontrolled operations (i.e., not having an air traffic control tower), and limited nearby residential areas make it an excellent location for pilots. In addition to the more common single-engine training aircraft, the Airport is regularly used by twin-engine turboprops as part of American Eagle's flight-training program.

- A specialized recreational resource for the community's citizens – To many pilots who fly primarily as a recreational activity, flying is fun and affordable only at a quiet, relatively inexpensive airport such as Porterville Municipal Airport. Also, aviation enthusiasts who are not pilots like to visit small airports to talk about and watch airplanes. The on-site restaurant serves as a gathering place for recreational-oriented users.

- A bad-weather alternative to other Central Valley airports – Despite the full instrument landing system available at both Meadows Field and Visalia Municipal Airport, seasonal ground fog often prevents landings either because the visibility is too poor or the pilot and/or aircraft are not instrument rated. The typical weather pattern is for areas adjacent to the Sierra foothills (such as Porterville Municipal Airport) to be the last to be covered by fog and the first to be clear. It is also common for the edge of the fog to end a short distance west of the Airport.

FUTURE

The future facility requirements for Porterville Municipal Airport will be shaped by the role selected for the Airport and the actual demand for aviation services. These factors will also affect the off-airport impacts associated with operations of the Airport. Five future scenarios were evaluated for potential applicability to the Porterville Municipal Airport:

1. Base case: The most probable future for the Airport; it assumes continuance of the existing uses.

2. Air Attack: Expansion of the California Division of Forestry/U.S. Forest Service Air Attack Base.

3. Airline: Airline service is established.

4. Cargo: Development of cargo service.

5. Regional Service: Establishment of major fixed based operations with a regional/interstate clientele.

Base Case

This scenario represents the most probable future for the Porterville Municipal Airport. The scenario envisions a gradual expansion of the existing uses at the Airport with a modest increase in the number of turboprop and turbofan (jet) aircraft.

Air Attack

The Airport currently has an Air Attack Base jointly operated by the California Department of Forestry and the U.S. Forest Service (CDF/USFS). The typical complement of fire fighting aircraft includes two tankers (i.e., DC-6's) and one air attack aircraft (i.e., S-2). The main air attack base for the region is located at the Fresno Air

Terminal. Given the increasing concern over noise at the Fresno Air Terminal, it is plausible that CDF/USFS would wish to relocate the facility to the Porterville Municipal Airport in the future.

CDF/USFS is keenly aware of the increasing sensitivity to noise at Fresno Air Terminal (and other air attack bases). Most air attack aircraft are converted military or airline aircraft powered by large radial engines. Because of the noise produced by these aircraft, as well as their age, CDF/USFS is actively seeking cost-effective replacements.

One approach being evaluated is the replacement of the radial engines with turboprops. An engine conversion has been made to a Gruman S-2. Operational testing of this aircraft, which is based at Fresno Air Terminal, began during the past fire season. Another approach which will likely be used in the future is to introduce medium-sized turboprop aircraft (e.g., Lockheed-Georgia C-130 Hercules).

Despite the efforts of CDF/USFS, if the air attack base must be moved from Fresno Air Terminal, Porterville Municipal Airport is unlikely to be the preferred replacement site. The Airport is too far south to optimally serve the region to which the aircraft are assigned. The Porterville Municipal Airport is also distant from the region's administrative and logistical support centers. A more likely candidate would be Lemoore Naval Air Station (or another air base). Alternately, CDF/USFS would consider developing a new airport.

It is, therefore, judged unlikely that the Porterville Air Attack Base would be significantly expanded during the 20-year period covered by the Airport Master Plan.

Airline

As designed, the airfield at Porterville Municipal Airport can accommodate commercial airline aircraft as large as the Fokker F-28 (65 passenger version), as well as the twin-engine turboprop aircraft currently used by commuter airlines. It is, therefore, appropriate to evaluate the likelihood of airline service to Porterville Municipal Airport.

Nationally, there is an annual average of approximately one airline trip per person. As Porterville Municipal Airport is unlikely to become a transfer point for airline passengers, one trip can be assumed to generate one enplanement. An enplanement is counted each time a passenger boards an aircraft. Although this ratio will vary depending upon geographic locations, income levels and other factors, this average can be used as a planning tool to estimate potential demand.

The service area of Porterville Municipal Airport is forecast to be approximately 100,000 in 2008. The service area includes the city and portions of Tulare and Kern County. Most airlines will only serve an airport if it can support at least 35 flights per week (this varies from airline to airline, but 35 is common). If 100% of the airline passenger enplanements originating in the Porterville Municipal

Airport's service area were enplaned at the Airport, each departing flight would have an average of 55 passengers. At this level of use, the Airport could support service by one of the commuter airlines (e.g., United Express or American Eagle).

Several factors make it likely that a commuter airline would actually enplane only 10% to 20% of the passengers originating in this area:

- Resistance to flying in propeller-driven aircraft.
- Residents are accustomed to driving to a larger airport (i.e., Meadows Field or Fresno Air Terminal).
- Cost of the fares compared to the direct cost of driving.
- Reliability problems because of fog.

With a capture rate of 10% to 20%, the average flight would contain only 6 to 11 passengers. At this level of enplanements, it is uncertain whether the larger commuter airlines could economically provide service. If some of Porterville's flights were connecting flights originating elsewhere (e.g., Meadows Field), it becomes more likely that the Airport could support scheduled airline service. It is possible that a commuter airline using smaller, 6- to 8-passenger aircraft could provide service at this enplanement level. However, passenger resistance to flying in small aircraft is so high, that this type of service is typically viable only in truly remote areas.

It is, therefore, judged unlikely that the Porterville Municipal Airport will receive airline service within the first half of the 20-year planning period. Limited service by twin-turboprop aircraft becomes possible near the end of the planning period.

Cargo

Three types of all-cargo operations were evaluated: General, agricultural, and small-package. These three categories cover the range of all-cargo operations which could conceivably operate from Porterville Municipal Airport using large turbine-powered aircraft.

General

The general air cargo industry is even more concentrated than that of the major passenger carriers. The advent of the large air-carrier jets (e.g., Boeing 747) dramatically increased the volume of cargo that could be carried in the bellies of passenger aircraft. This resulted in a decline in the number of all-cargo aircraft. The few remaining all-cargo airlines have concentrated their operations at a few major air carrier airports (e.g., San Francisco International). It is considered to be highly unlikely that a general air cargo airline would seek to operate from Porterville Municipal Airport.

Agricultural

The prominence of agriculture in the region surrounding Porterville offers the potential that agricultural commodities could sustain an all-

cargo operation. Two conditions must be met for an agricultural cargo operation to succeed:

1. There must be local products with high enough value per weight and volume to justify transport by air.

2. There must be a product(s) which can be back-hauled to pay for the return trip of the aircraft.

No local products have been identified which would satisfy the first condition. Finding a suitable commodity to back-haul would be expected to be difficult because of the availability of belly-haul and all-cargo transport directly to the major metropolitan areas. Also, cargo hauling is not as time/convenience sensitive as passenger service. Trucking commodities to Fresno, Bakersfield, or even Los Angeles would typically be acceptable. Therefore, it is judged unlikely that an agricultural cargo operation would be established at Porterville Municipal Airport.

Small-package

The current national trend with the small-package shippers (e.g., United Parcel Service and Federal Express) continues to be the establishment of regional distribution centers in primary or secondary air carrier airports in major metropolitan areas. However, due to the predominance of night aircraft operations (and the attendant noise) by these shippers, the development of these new centers is frequently controversial. It is plausible that these small-package operations will begin seeking airports where their nighttime operations will not be so disruptive. Porterville Municipal Airport has some characteristics which make it a potential site: uncongested airspace, lack of residential development, and substantial amounts of undeveloped airport property. It is, therefore, appropriate to evaluate the potential for establishment of a small-package cargo operation.

Because of the proximity to the Bakersfield and (to a lesser degree) Fresno metropolitan areas, it is assumed that a small-package shipping operation at Porterville Municipal Airport would include a truck delivery component. The principal role of the Airport, however, would be to serve as the point where smaller aircraft (coming from local distribution centers) exchange their loads with larger aircraft (coming from the national distribution center).

Due to the high summer temperatures, the larger aircraft would need a runway length of approximately 10,000 feet. As is discussed in Chapter 7, there are no insurmountable obstacles to the extension of the runway. It would require the acquisition of additional land and closure of Scranton Avenue. Tulare County would have to agree to the abandonment of the affected portion of Scranton Avenue.

There are several other airports within the southern Central Valley which have the same general advantages as Porterville Municipal Airport, without the same degree of limitations on the runway extension. Additionally, some of these airports have direct access to Highway 99, precision instrument approaches, and other desirable characteristics.

From the information currently available, it is judged unlikely that a small-package shipping facility will be established at Porterville Municipal Airport during the 20-year planning period.

Regional Service

The runway at Porterville Municipal Airport is 6,000 feet in length, 146 feet wide, and capable of accommodating dual-wheeled aircraft weighing up to 50,000 pounds. Even during the hottest days of the summer, almost all general aviation aircraft – including corporate jets – can be accommodated. There is an abundance of land potentially available for new aviation uses. It is, therefore, appropriate to investigate the prospect of major general aviation maintenance/service facilities being established.

In order to be a significant departure from the existing scale of maintenance/service facilities, the new fixed base operations would need to be high-value/ high-volume businesses drawing customers from throughout the region – region in the sense of Western United States. Within the range of general aviation services which fit this broad category, three categories were identified which represent the range of possible businesses: corporate aircraft maintenance, aircraft modification, and agricultural aircraft maintenance and customizing.

Corporate aircraft maintenance: Although the airfield could accommodate larger corporate aircraft, the geographic location of Porterville Municipal Airport places it at a competitive disadvantage. The Airport does not have convenient access to an airport with scheduled service. This would make it cumbersome to transport flight crews to and from a facility when an aircraft was left for maintenance. As a non-metropolitan area, Porterville is also likely to be perceived as having few cultural and recreational amenities. This would make the area less attractive as a site for crew layovers during maintenance. Freight access would also be superior at a site closer to a major metropolitan area.

Aircraft modification: The business of retrofitting larger, more sophisticated engines and other after-market modifications has become a major industry in the United States. The limitations of the Airport's location which applied to corporate maintenance also apply to aircraft modification, although to a somewhat lessor degree. Much of the modification market is targeted towards aircraft owned by individuals and small businesses. Although the location of Porterville Municipal Airport will not be viewed as an advantage, informal methods of accommodating the pilots ferrying the aircraft will be more readily accepted (e.g., driving or flying the pilots to Meadows Field). When selecting an airport at which to be based, owners of these businesses are more likely to be concerned with low land prices and their personal preferences on the suitability of the area as a place to live.

Agricultural aircraft maintenance and customizing: The potential market for this type of service is more limited than the two previously discussed. However, the location and current role of Porterville Municipal Airport give it an advantage over airports closer to major

metropolitan areas. To a greater degree than the two categories previously discussed, this form of business could initially be supported by existing nearby clientele.

Based upon the foregoing analysis, it is plausible that agricultural and modification businesses could be attracted to Porterville Municipal Airport, but large aircraft maintenance facilities appear unlikely. The Airport Layout Plan should preserve the option of accommodating this use, but no funds should be expended in anticipation of their development.

CONCLUSIONS

- The most likely future for Porterville Municipal Airport is a continuation of the existing uses with a modest increase in use by turboprop and turbofan aircraft.
- The Porterville Air Attack Base will not be significantly expanded.
- Limited scheduled passenger service (using twin-engine turboprop aircraft) is possible near the end of the 20-year planning period.
- Development of a small-package cargo operation is not likely to occur during the 20-year planning period.
- The potential for development of agricultural aircraft or aircraft modification businesses is sufficiently plausible for it to be appropriate to preserve the potential to accommodate these uses.

6

Airport Activity

6

AIRPORT ACTIVITY

HISTORICAL AVIATION ACTIVITY

An understanding of an airport's current and historic activity forms the basis for projecting and evaluating future facility needs and financial condition. The two primary measures of general aviation activity are the number of aircraft based on the field and the number of aircraft operations which take place there annually.

Based Aircraft

The number of aircraft based at Porterville Municipal Airport showed a slight increase from 1977 (75 aircraft) through 1985 (88 aircraft). However, since 1985 there has been a slight decrease in the number of based aircraft (84 aircraft). This trend generally parallels the trend for Tulare County as a whole. Approximately 20% of the based aircraft are twin-engined with the balance being single-engined.

Aircraft Operations

As is typical of airports which do not have an air traffic control tower, there are no comprehensive counts of aircraft maintained at Porterville Municipal Airport. In these circumstances, the most accurate method of estimating operations is using a multiplier tied to the number of based aircraft. The ratio of annual operations to based aircraft at California general aviation airports similar to Porterville Municipal Airport ranges from 300:1 to 400:1. Using these ratios, the current number of annual operations at Porterville Municipal Airport is estimated to be between 25,000 and 35,000. Included in this forecast are the operations by air attack aircraft (fire bombers), which have averaged approximately 700 operations per year during the last five years. For planning purposes, a median figure of 30,000 operations will be used.

Instrument Operations

Instrument operations comprise a distinct subcategory of aircraft activity at Porterville Municipal Airport. Because these operations are handled by Bakersfield Approach Control, a count of their occurrence is maintained. The number of approaches has gone up and down over the last 10 years as shown below. Weather conditions have undoubtedly contributed to this record.

Fiscal Year	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
Instrument Approaches	282	174	71	192	252	166	201	121	154	105

Aviation Safety Record

Data from local sources indicates that 18 accidents and lesser incidents have occurred since 1970. There are no indications that airport facilities or operational procedures contributed to any of these accidents.

AVIATION DEMAND FORECASTS

Based Aircraft

Several factors typically influence the demand for aircraft parking space at an airport. Among them are:

- The population of the airport service area.
- The local economy – its strength and the number, type, and size of local businesses.
- The remoteness of the area from major metropolitan centers.
- Facilities and services available at the airport.
- The proximity of other airports and the extent of facilities and services provided.
- Aircraft ownership and operational costs

There has been enough consistency in most of these factors for them to offer significant guidance in forecasting. The greatest uncertainty lies within the aviation industry itself; the last five years have seen major changes in airline service, aircraft manufacturing, and patterns of personal aircraft use. The trends which contributed to the forecast of based aircraft are as follows:

Population – Both Tulare County and Porterville have experienced significant growth in the last decade. This trend is forecast to continue and there are no obvious physical limitations to this growth.

Economy – Agricultural has remained a strong element of the local economy, while the amount of industrial employment continues to grow. The increased diversification of the economy will buffer the local economy from the impacts of short-term fluctuations in any one industry.

Remoteness – Although Porterville Municipal Airport is not in the midst of a metropolitan area, it is also not distant enough from Meadows Field in Bakersfield (and, to a lesser extent, Fresno Air Terminal) to become a regional center for air transportation. The distances to the Los Angeles and San Francisco metropolitan areas are, however, great enough for aviation to continue to be needed to access metropolitan services and amenities.

Porterville's Facilities and Services – The Airport has essentially all facilities and services necessary to support general aviation aircraft. Although flight training is not a major activity at Porterville Municipal Airport, most of the other elements of general aviation service (i.e., engine and airframe maintenance, and air taxi service) are well represented. The nonprecision approach and 6,000-foot runway provide all of the essential airfield requirements for general aviation aircraft (including corporate aircraft).

Ownership and Operational Costs – This factor is essentially neutral in terms of favoring one airport over another. High costs tend to discourage aircraft ownership and use at all airports and have contributed to the decline in general aviation usage not only in California, but nationwide. If current conditions continue, very few small, general aviation aircraft will be added to the fleet nationwide in the coming years. Some strength may remain in the growth of the corporate aircraft fleet. Individual airports consequently would gain based aircraft only as local factors dictate the shift of aircraft from one airport to another – the minor advantages in lower fuel and aircraft storage costs at one local airport versus a competitor, for example; but more significantly the comparative differences in population and economic growth from one region to another.

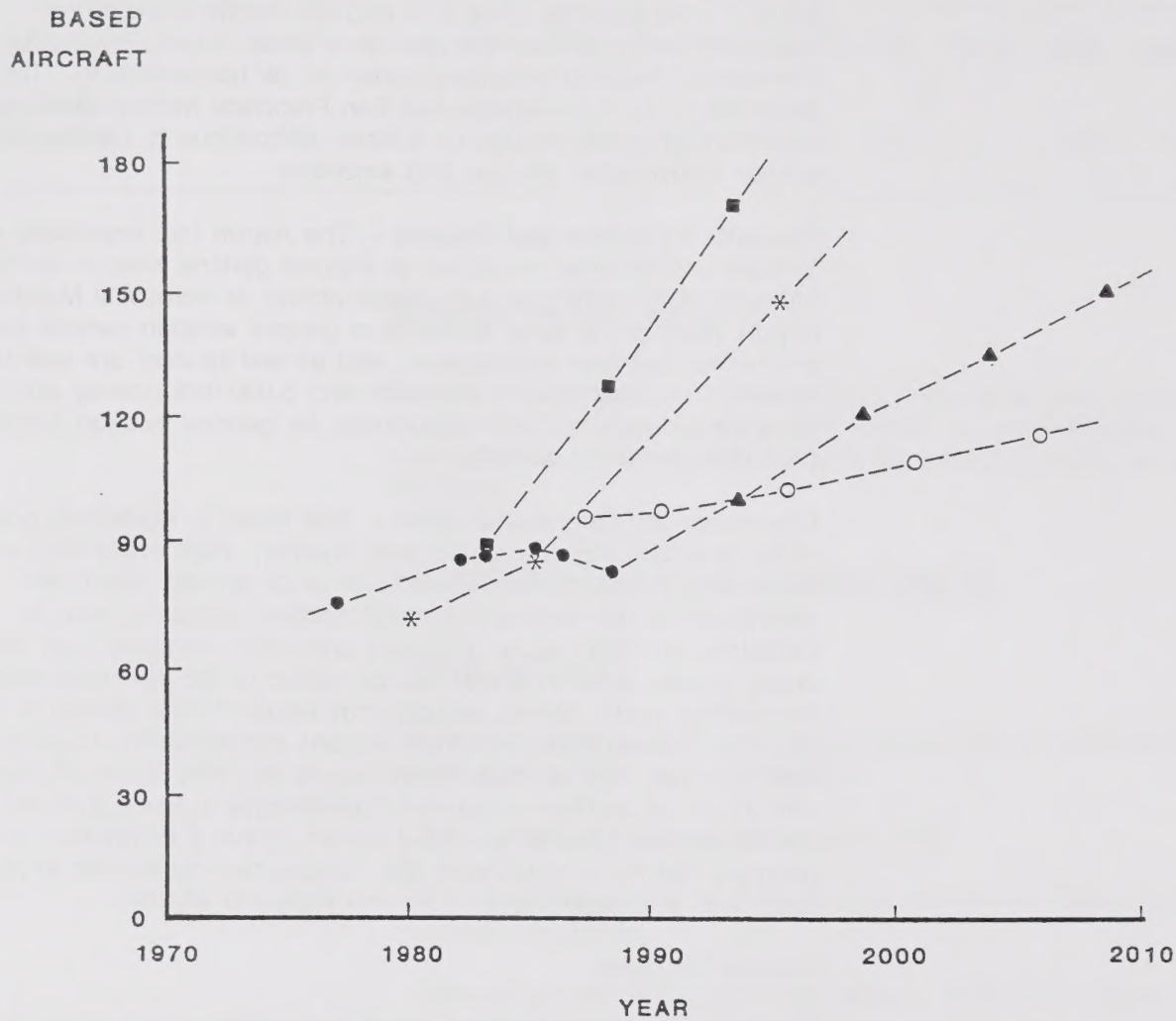
Existing Forecasts

The Federal Aviation Administration's National Plan of Integrated Airport Systems (1983) and Caltrans' California Aviation System Plan (1981) based aircraft forecasts for Porterville Municipal Airport are shown in Figure 5. Also included are preliminary forecasts recently prepared for Caltrans, but not yet publicly released. Significant differences in the three forecasts are readily apparent. The FAA and earlier State forecasts do not reflect the national downturn in general aviation aircraft ownership.

Master Plan Forecast

The number of aircraft projected to be based at an airport is a primary forecast element and is usually an important indicator of all types of general aviation activity. The projections were generated in a two-step process: (1) future aircraft ownership for Tulare County was forecast, and (2) that portion to be based at Porterville Municipal Airport was then estimated.

The forecast of total county aircraft is based upon a per capita ownership factor and Tulare County's population as forecast by the California Department of Finance. The current ownership rate is approximately 16.5 aircraft per 10,000 residents. This rate is projected to slowly rise to 20.0 by the end of the 20-year forecast period.



L E G E N D

- Historic Based Aircraft (Sources: 5010 forms, airport records, NPIAS)
- Hodges & Shutt forecast
- FAA, "National Plan of Integrated Airport Systems" (1983)
- Preliminary results of forecasts being prepared for California Division of Aeronautics (1988)
- California Aviation System Plan (1981)

FIGURE 5

BASED AIRCRAFT
Historical and Forecast

HODGES & SHUTT

The application of this rate to the State population forecasts results in the following projection of based aircraft in Tulare County:

Year:	1993	1998	2003	2008
Based Aircraft:	550	625	700	785

The share of aircraft based within Tulare County that were located at Porterville Municipal Airport has been in the range of 18% in recent years. This is expected to grow slightly due to growth in industry and closure of private airports in the area. Porterville Municipal Airport's share of aircraft based in Tulare County is forecast to grow to 150 (Figure 6) during the next 20 years.

Transient Aircraft

Transient aircraft parking is highest in June through September. During periods of peak usage one can expect to find up to three twin-engine and eight single-engine aircraft on the transient ramp at one time. The largest aircraft regularly seen on the ramp are Beech King Airs and Cessna Citations. The demand for transient aircraft parking is expected to double during the 20-year planning period.

Aircraft Operations

The forecasts of based aircraft, coupled with the operations per based aircraft ratios discussed previously, were used to develop the forecasts of operations (Figure 6). These projections were used to analyze the future airfield capacity needs of Porterville Municipal Airport.

CAPACITY ANALYSIS

Airfield

The capacity of the airfield to accommodate aircraft operations under both visual and instrument meteorological conditions was calculated. The total annual capacity of the airfield is estimated to be 200,000 peak hourly capacity during visual meteorological conditions is calculated to be 80. The radar coverage for the Porterville area only extends down to 4,000 feet MSL. Because of this limitation, the peak hourly capacity is restricted to between six and ten aircraft.

Aircraft Parking

Transient

The existing designated spaces should be adequate to accommodate regular peak parking demand by transient aircraft. However, continued growth in transient aircraft operations may eventually require conversion of some based tiedown spaces adjacent to the fuel farm

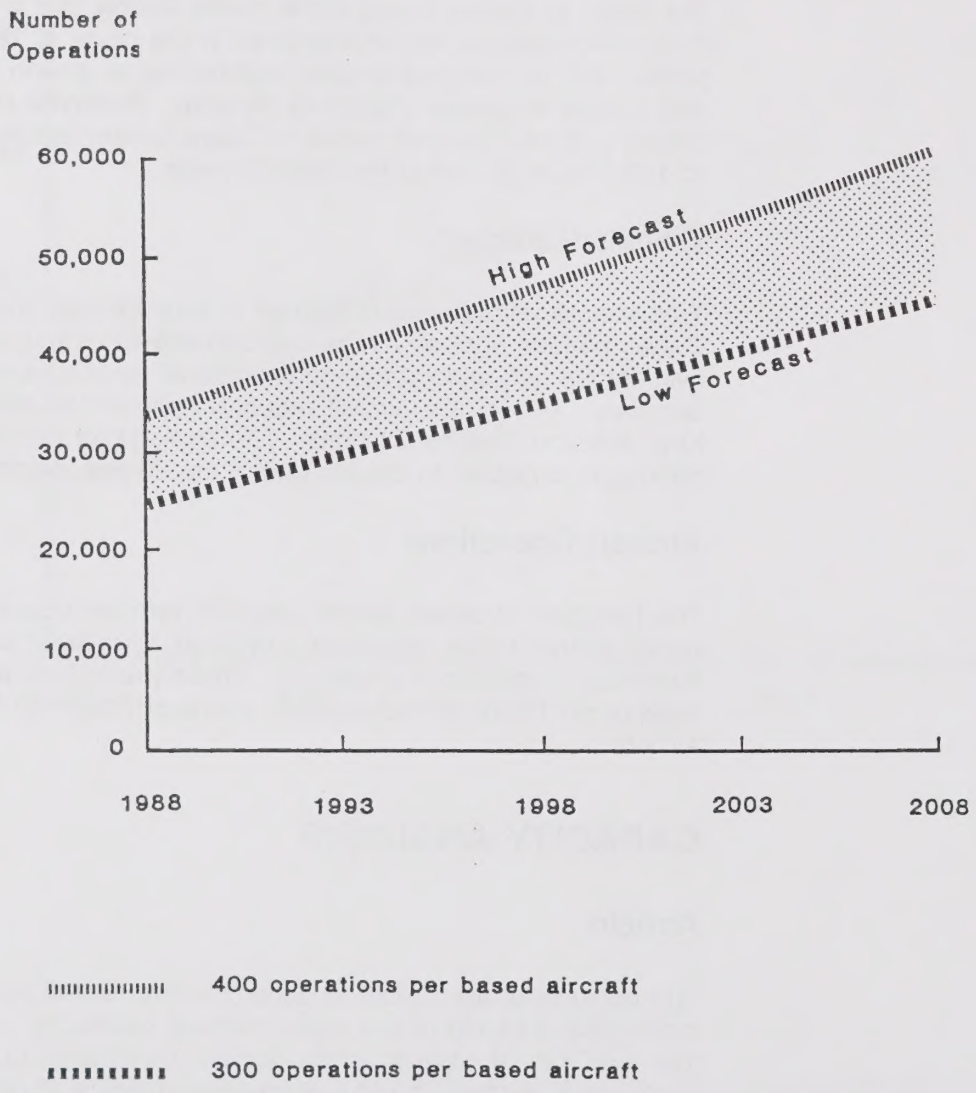


FIGURE 6

FORECAST OF OPERATIONS

HODGES & SHUTT

to transient parking spaces. It is recommended that large aircraft parking remain in the area fronting the terminal building. This will permit continued utilization of the high strength pavement (i.e., portland cement concrete) in that area.

There are more tiedown positions currently marked, but 13 are located within the aircraft parking limit line and are not included in the calculation of capacity. Details are presented in Chapter 8.

Based

There are currently 38 aircraft storage hangars (including shade hangars) and 50 tiedown positions (including private spaces) on the airfield. Sites have been designated for 128 additional aircraft parking positions. All but 12 of these positions could be efficiently developed as either tiedowns or hangars. This capacity exceeds by a substantial margin the forecast demand

Environmental

An important third type of airport capacity is that associated with an acceptable degree of environmental impacts – particularly noise impacts. For many airports in urban areas, future airport development is constrained more by environmental capacity than by either airfield or aircraft parking capacity. This is not expected to occur at Porterville Municipal Airport. Measures to minimize potential conflicts between the Airport and its surrounding uses are nonetheless important. This topic is addressed in Chapter 9.

7

Airfield Design

7

AIRFIELD DESIGN

DESIGN ISSUES

A number of design issues were initially identified as being important to the future of the airfield. During the course of the study, other issues have been recognized as important to the Airport's use and development. The most significant issues identified to date are:

- Potential aeronautical role of Runway 7-25 (presently closed).
- Future length of Runway 12-30.
- Safety area requirements.
- Accommodating a precision instrument approach
- Siting an automated weather observing station

AIRFIELD DESIGN STANDARDS

Appendix B discusses the relationship between specific characteristics of an airport's "critical" aircraft and the design standards applicable to the Airport.

The choice of airfield classification most suited to the facility's current use and future development is not a central issue at Porterville Municipal Airport. The Airport was built in accordance with Transport standards – a classification intended to accommodate larger commercial aircraft. As discussed in Chapter 5, this role is expected to continue to be appropriate for Porterville Municipal Airport.

A review of the Airport's existing dimensions, shown in Appendix B, reveals that it meets most of the current standards. The most notable deficiency is with regard to the length of the safety area at each end of the runway. The significance of this short coming is addressed later in this chapter.

RUNWAY 07-25

Alternatives

In 1976, the FAA formally released the City of Porterville from its obligation to maintain Runway 7-25 and the associated midfield taxiway. The runway and taxiway have remained closed since that time. The current Airport Layout Plan (ALP) designates much of the area occupied by this runway and taxiway for nonaviation commercial

and industrial use. Much of the pavement remains, albeit in a deteriorated state. There is considerable interest on the part of many local pilots in reopening the runway or, at least, retaining the potential for future aviation use. It is appropriate to consider whether there is an existing or longer term aviation role that this pavement could serve. The advantages and disadvantages of three alternative uses of this portion of the Airport are presented in Table 6.

Cost of Rehabilitation

Although the existing surface of the closed runway remains generally smooth, the pavement is badly aged. There are isolated depressions and alligator cracking. The surface is actively raveling and has cracked into blocks less than six inches in diameter. The deterioration would rapidly accelerate if the pavement was regularly used.

Cost estimates were developed for two alternative methods of rehabilitating the pavement for use as a runway. One can be categorized as a "quick fix" and the other is a full restoration. Table 7 defines the two alternatives. As it would be desirable to restore the midfield taxiway to use, the cost for its rehabilitation is shown. However, given the infrequent use expected for this runway, it would be possible to require aircraft to taxi back on the runway. This would reduce the cost of restoration. Costs were also estimated for conversion of the existing runway to a taxiway. As large aircraft hangars are a likely use, costs were based upon a 50-foot taxiway designed to accommodate aircraft up to 12,500 pounds. In all three alternatives, pavement marking and striping is included. Lights or reflectors are not included.

Recommendation

It is recommended that the City of Porterville retain the ability to develop a taxiway along the course of the closed runway. This option would preserve the ability to develop aviation uses in the area between the closed runway and Tea Pot Dome Road. The option of reactivating Runway 7-25 was rejected principally because the cost of rehabilitation far outweighed the benefit. The option of eliminating aviation access to the west side was rejected as unnecessarily restricting the aviation potential of the Airport.

LENGTH OF RUNWAY 12-30

An important element of most airport master plan studies is the analysis of the runway length required to serve the long term needs of the airport. Many airports in metropolitan areas did not preserve the option of extending their runways and are now physically prevented from doing so. The runway length is determined by the requirements of the most demanding aircraft expected to regularly use the Airport. Balanced field length is the measure used to determine the runway length required for turbojets and other transport category aircraft. As the fire attack aircraft cannot necessarily be assumed to be the most demanding aircraft in the future, the balanced field length requirements for the C-130 and a range of corporate

Table 6

RUNWAY 7-25 ALTERNATIVES

Abandon the pavement

Advantages

- Would open the possibility that the land could be used for industrial, recreational or other nonaviation uses.

Disadvantages

- Would prevent continued use for parking fire attack aircraft.
- Eliminates potential future use for aviation purposes.

Retain as a taxiway

Advantages

- Preserves option for aviation uses adjacent to taxiway. Rehabilitation of pavement need not occur until a demand for use exists.
- Makes cost of pavement rehabilitation eligible for FAA grant funds.

Disadvantages

- Would require maintenance once reactivated.
- Could result in use as a crosswind runway. This would result in increased liability exposure for the City.

Reopen runway

Advantages

- Would make Porterville Municipal Airport one of the few airports in the San Joachin Valley with a crosswind runway. The closest airport with a crosswind runway is Shafter Airport, which is located 32 miles to the south (near Bakersfield).
- Would increase the relative attractiveness of the Airport for use by light aircraft, especially tailwheel aircraft.
- Would provide an alternate runway which could be used when the main runway was closed due to an accident or construction.

Disadvantages

- The available wind data and a recent survey of pilots suggest that a crosswind runway is very seldom needed. It may not be cost effective to invest in a facility that will be seldom used.
- The runway would need to be rehabilitated before it could be reopened. FAA grant funds could not be used for the rehabilitation because the existing wind data does not support the need for a crosswind runway.
- Increased costs associated with pavement maintenance.

Table 7

RUNWAY 7-25 REHABILITATION ALTERNATIVES

USE AS A RUNWAY

Runway is designed as a crosswind runway for single-engine and light, twin-engine aircraft. The runway dimensions are 60 feet by 2,700 feet. The associated taxiway would be 25 feet in width.

Slurry Seal
This alternative would involve filling the depressions and coating the pavement with a double slurry seal.

Cost (including engineering and contingencies)

Runway:	$ 45,000
Taxiway:	25,000
TOTAL:	$ 70,000

Lifespan
The slurry seal treatment can be expected to last one to three years before major rehabilitation is required (depending upon frequency of use). There will be ongoing maintenance required each year (e.g. crack filling). Deterioration will likely begin with reflective cracking and eventually general raveling will begin to occur.

Overlay
This alternative would involve laying paving fabric over a prime coat of asphalt and then overlaying with two inches of asphaltic concrete. Some drainage improvements may be required, but no estimate of drainage improvement costs can be made with the available data.

Cost (including engineering and contingencies)

Runway:	$150,000
Taxiway:	75,000
TOTAL:	$225,000

Lifespan
The overlay can be expected to last 10 to 15 years before another overlay is required. The two-inch overlay will be adequate to accommodate use by aircraft weighing less than 8,000 pounds. Seven to ten years after the overlay it is likely that a slurry seal will be required.

USE AS A TAXIWAY

This taxiway would be designed to accommodate aircraft up to 12,500 pounds. It would be 50 feet in width and would extend the full length of the abandoned runway (3,800 feet).

Overlay
This treatment would be the same as described in the runway overlay except that the overlay would consist of three inches of asphaltic cement. The increase section is designed to accommodate the heavier aircraft anticipated to regularly use the taxiway.

Cost (including engineering and contingencies)

Taxiway:	$230,000

Lifespan
As with the runway overlay described above, this overlay can be expected to last 10 to 15 years before another overlay is required.

aircraft were calculated (Table 8). The calculations for the corporate aircraft were based upon plausible passenger loads and trip lengths rather than the maximum gross takeoff weight.

Based upon these figures, it is concluded that the current length of Runway 12-30 is adequate to accommodate the range of aircraft anticipated to regularly use the Porterville Municipal Airport through the end of the 20-year planning period. However, the recommended property acquisition program would preserve the option of extending of Runway 12-30 as much as 2,000 feet.

SAFETY AREA REQUIREMENTS

Safety Area: An area adjacent to and extending beyond a runway which is designed to accommodate the passage of an aircraft without causing structural damage to the aircraft or injury to its occupants.

The current FAA dimensional standards for safety areas for Transport category runways is 500 feet in width and 1,000 feet beyond the end of the runway. Because of the presence of county roads, the safety area does not extend the full 1,000 feet beyond the runway at either end. The end of Runway 12 is 470 feet from Scranton Avenue; the end of Runway 30 is 580 feet from Tea Pot Dome Avenue.

FAA guidelines permit the continued use of runways with safety areas which do not meet current standards, if the runway was constructed prior to adoption of the standard. Acquisition of additional land to meet the current standard would require relocation or closure of Scranton and Tea Pot Dome Avenues. The only transport category aircraft regularly using the Airport are the fire attack aircraft which average only 700 operations annually. The cost and complications of attaining the current standard is therefore judged to exceed the potential benefit.

POTENTIAL PRECISION INSTRUMENT APPROACH

A *precision instrument approach* is one which provides directional (azimuth) and vertical guidance, and distance information.

Many of the pilots who responded to the survey questionnaire prepared for this Master Plan study would like to see the development of a precision instrument approach procedure for Porterville Municipal Airport. The existing runway dimensions and surrounding topography appear adequate to permit the development of a precision instrument approach. The key questions then are:

- Can the necessary instruments and lighting systems be physically accommodated on the airfield?
- Can a precision instrument approach be justified?

These questions are examined in the paragraphs which follow.

Equipment Siting Requirements

Three of the components required to establish a precision instrument approach are typically located on airport property. The three components provide: (1) course or bearing information to the runway end, (2) a glide path/slope indication, and (3) illuminated ground

Table 8

RUNWAY LENGTH REQUIREMENTS
(Balanced Field Length)

Porterville Municipal Airport

Mean Maximum Temperature 99°F 444 Feet MSL

C-130 (civilian)	4,200 feet
At gross takeoff weight (125,000 pounds)	
C-130 (military)	5,900 feet
At gross takeoff weight (145,000 pounds)	
Citation II	3,400 feet
1,000 nautical mile flight with IFR reserves	
Two crew, five passengers	
Learjet 30 series	4,600 feet
1,000 nautical mile flight with IFR reserves	
Two crew, four passengers	
Learjet 55	5,700 feet
1,000 nautical mile flight with IFR reserves	
Two crew, four passengers	
Gulfstream II	5,800 feet
2,000 nautical mile flight with IFR reserves	
Two crew, eight passengers	
Gulfstream III	4,400 feet
2,000 nautical mile flight with IFR reserves	
Two crew, eight passengers	

Information taken from FAA-approved flight manuals and manufacturer's flight planning computer program

visual references. In a conventional Instrument Landing System (ILS), the first two components are called a localizer and a glide slope, respectively. In a Microwave Landing System (MLS), they are referred to as the azimuth station and elevation station.

The Microwave Landing System is a comparatively new technology which has been installed at only a few airports and, to a significant extent, is still considered experimental. It has important advantages over an ILS in terms of being much less susceptible to signal interference as well as allowing more flexibility in the design of the approach procedure. Because of the high cost for equipment – both at airports and on board each aircraft – as well as other factors, the future of the MLS remains uncertain. The discussion below, therefore, is concerned only with ILS requirements. From an airport planning standpoint, this is a reasonable approach in that essentially anywhere an ILS could be installed, an MLS is expected to be at least as workable.

Localizer

The optimum location for a localizer is on the extended runway centerline, typically 1,000 feet from the runway end. A shorter distance can be used provided that the antenna does not become an approach surface obstruction and a longer distance also may be acceptable in certain circumstances.

The pattern of winds at Porterville Municipal Airport dictate that a precision approach procedure would be developed for Runway 30. The localizer, therefore, would be located 1,000 feet (to the northwest) beyond the physical end of the runway. This location is north of Scranton Avenue and west of Road 224 (Figure 7) on property which is currently privately owned. Acquisition of a portion of this parcel would be necessary to provide a site for the installation. Closure of the intersection of Scranton Avenue and Road 224 would also be required – the passage of vehicles on the roads would interfere with the localizer's signals.

Glide Slope

A glide slope antenna is located adjacent to the runway near the end with the precision approach. The standard installation uses an image-type glide slope which bounces the electronic signal off the ground in front of the antenna before it radiates upward along the glide path. Because of this arrangement, the ground in front of the antenna must meet specific grading requirements and the area must be kept clear of objects that would interfere with the signal while an aircraft is on an approach. There is sufficient land adjacent to the runway to provide the necessary site.

Approach Lighting System

The approach lighting system for established for a precision approach consists of a pattern of sequenced flashing lights and steady burning lights which orient the pilot to the runway and identify the landing threshold. This system of lights extends 2,400 feet from the runway threshold along the approach path. Development of a

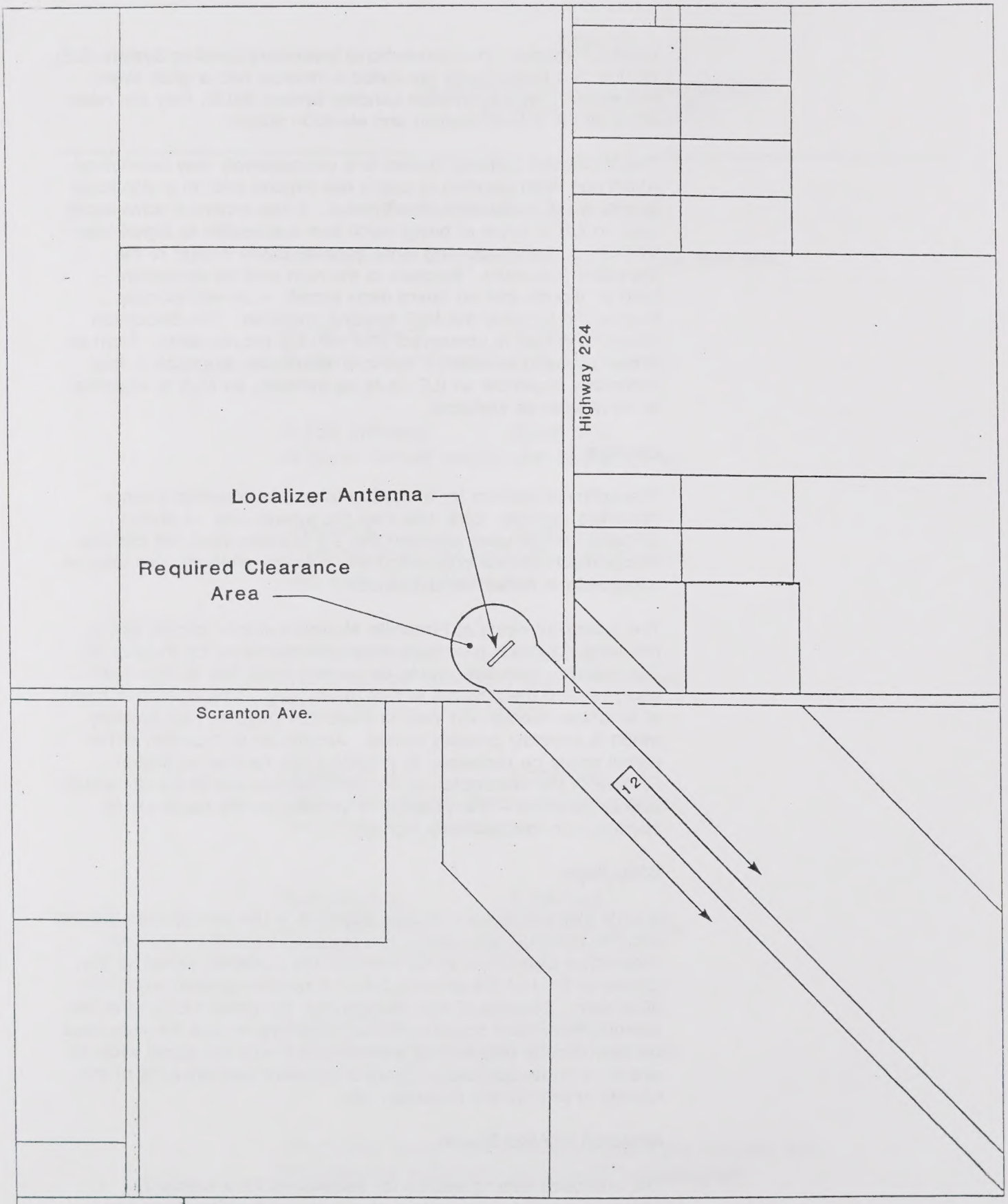


FIGURE 7

FUTURE LOCALIZER SITE

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precision approach could also require relocation of the intersection of Tea Pot Dome Avenue and Newcomb Street. One possible arrangement is shown in Figure 8.

Justification

Establishment of a precision instrument approach was cited in the user survey results as being one of the most beneficial improvements which could be made at the Porterville Municipal Airport. The existing nonprecision approach procedure provides approach minimums which are reasonable given the frequency of use and the local weather patterns. The upgrading to precision approach would not make a large difference in the ability of aircraft to land. The present nonprecision procedure allows straight-in approaches from the southeast with minimums as low as a ceiling of 496 feet above the Airport and a visibility of 1.0 statute mile. A precision procedure potentially could have minimums as low as 200 feet AGL and 0.5 miles if all related components (approach light system, outer and middle markers, etc.) were provided. No data is available to document how often the weather falls within the range where it is above precision minimums but below those for nonprecision. Low stratus with cloud ceilings in the range of 200 to 400 feet is, however, not cited as a frequent occurrence in the Porterville area.

In order for an airport to be a candidate for installation of a precision instrument approach system under the FAA Facilities and Equipment (F&E) Program, it must meet certain activity level criteria. The advantage of F&E funding is that, not only does the FAA pay 100% of the installation cost, it also maintains the equipment. Under the Airport Improvement Program, the airport sponsor would both have to pay a portion of the initial cost and then be responsible for the maintenance. The qualifying formula for the F&E program is based upon the recorded number of annual instrument approaches for the existing nonprecision approach, taking into account the best current approach minimums.

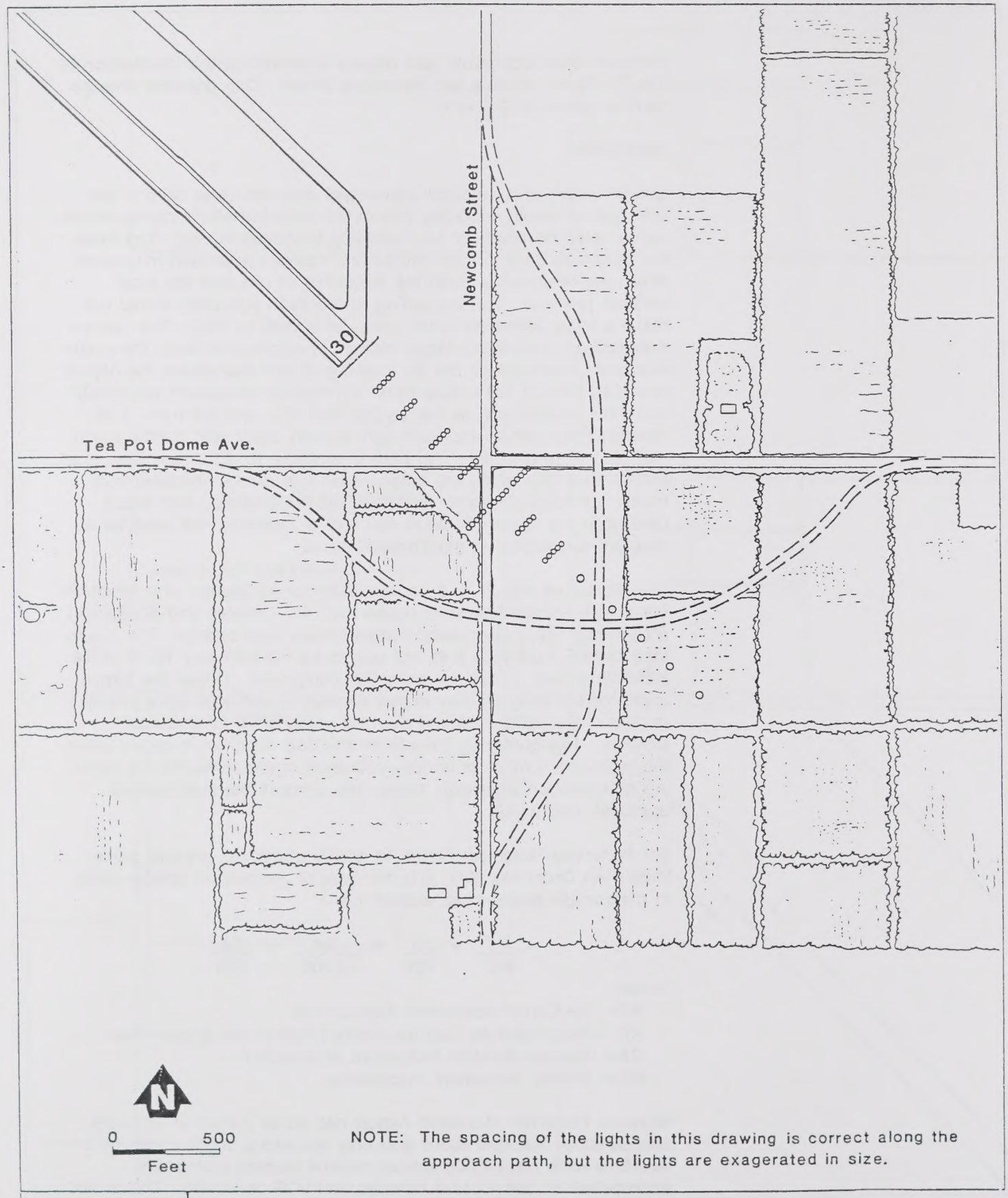
For Porterville Municipal Airport to qualify under the present guidelines (FAA Order No. 7031.2C), the total of the current activity ratios in the formula below must exceed 1.0.

$$\frac{AC}{400} + \frac{AT}{450} + \frac{GA}{2,000} + \frac{Mil}{900}$$

Where:

AC = Air Carrier Instrument Approaches
AT = Scheduled Air Taxi (commuter) Instrument Approaches
GA = General Aviation Instrument Approaches
Mil = Military Instrument Approaches

Because Porterville Municipal Airport has no air carrier or regularly scheduled air taxi operations and only occasional military activity, it would need to have 2,000 annual general aviation instrument approaches on the present nonprecision VOR approach. This is not forecast to happen during the 20-year planning period. However, as it is conceivable that air service by a commuter airline will be inaugurated near the end of the planning period, it is appropriate to take steps to preserve the ability to install the required equipment.



NOTE: The spacing of the lights in this drawing is correct along the approach path, but the lights are exagerated in size.

FIGURE 8	POTENTIAL INTERSECTION RELOCATION ASSOCIATED WITH PRECISION INSTRUMENT APPROACH

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The recommended property acquisition is shown on Figures 9 and 10.

AUTOMATED WEATHER OBSERVING SYSTEM

During instrument approaches to Porterville Municipal Airport, pilots must use the barometric pressure reading (for the onboard altimeter) from Meadows Field in Bakersfield. The FAA has recently changed its long-standing policy on use of barometric readings from sources distant from the airport being used; the FAA is now seeking to eliminate the use of remote barometric readings wherever possible. One means of accomplishing this is to install an Automated Weather Observing System (AWOS). This installation automatically senses weather conditions, analyzes the data, and broadcasts the information so it can be received on aircraft radios. Basic AWOS provide wind speed, wind direction, temperature, dew point, and barometric pressure readings. More sophisticated systems also register visibility and cloud height. Current information is that installation of an AWOS is planned for Porterville Municipal Airport as part of the first 160 units installed under the FAA's Facilities and Equipment program. If the announced schedule is adhered to, this would mean that the AWOS would be installed within two years.

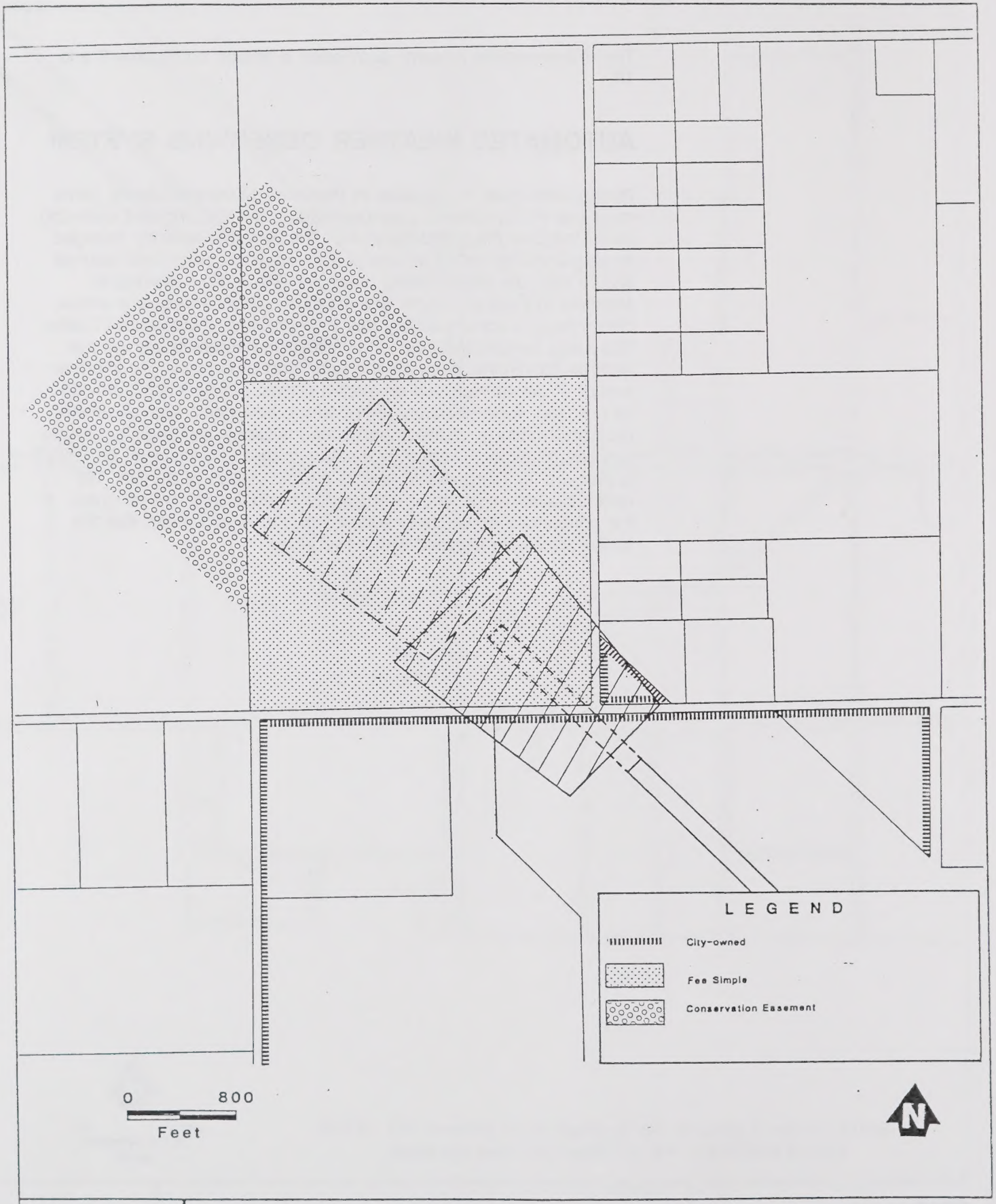

FIGURE 9

RECOMMENDED PROPERTY ACQUISTION

NW RUNWAY 12

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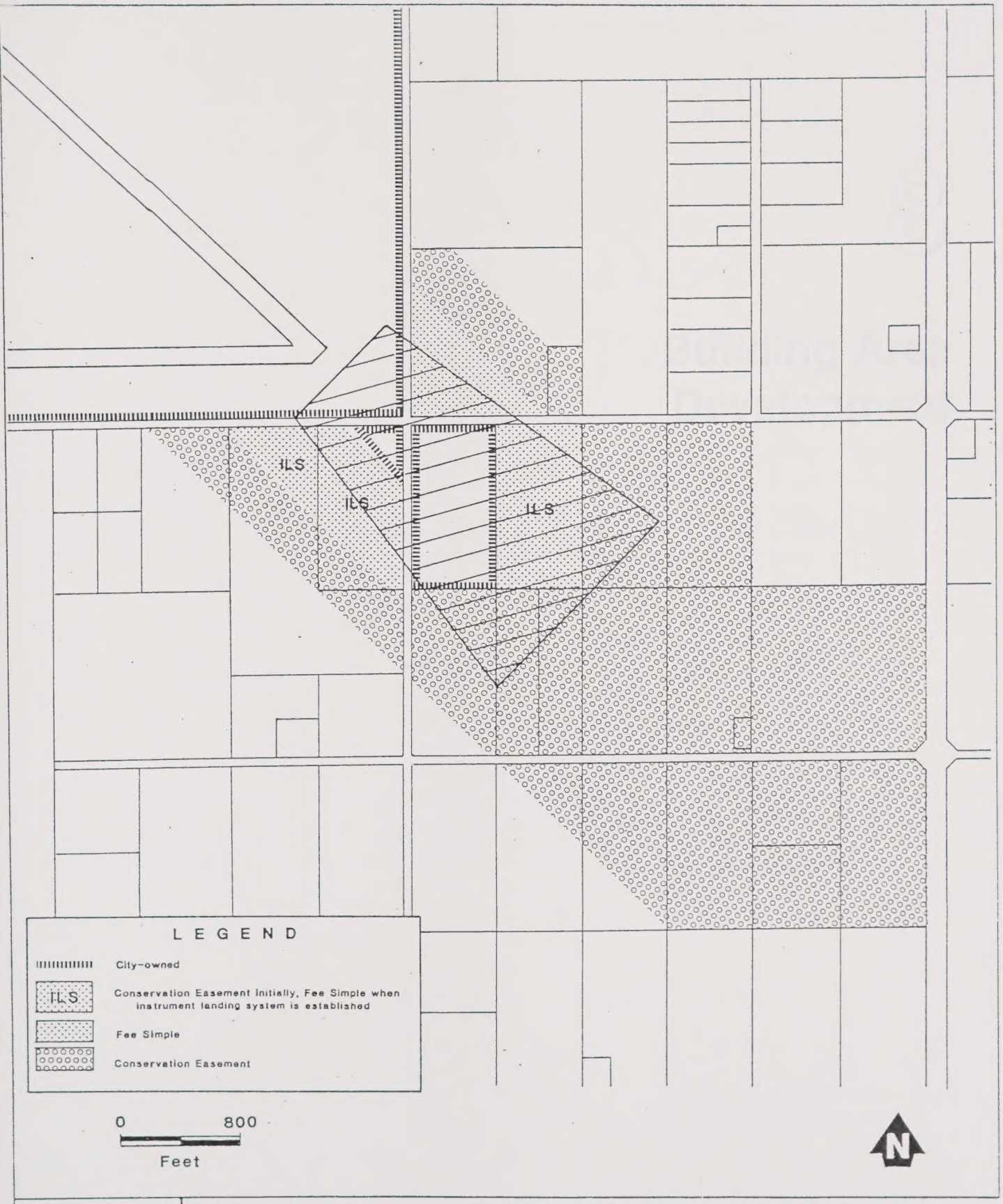

FIGURE 10

RECOMMENDED PROPERTY ACQUISITION

SE RUNWAY 30

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8

Building Area Development

8

BUILDING AREA DEVELOPMENT

BUILDING AREA USES

Facilities normally found within the building area of a general aviation airport include: Aircraft tiedown and hangar space, fixed base operation facilities, fuel storage and dispensing equipment, and automobile parking. At busier airports, one will sometimes find an manager/operations office, coffee shop, and nonaviation commercial/industrial uses. At Porterville Municipal Airport, all of these uses can be presently found within the building area.

This chapter examines the demand for and possible ways of accommodating additional building area facilities. First, though, it is important to understand the constraints which aeronautical criteria and existing physical conditions place upon any potential building area development.

DEVELOPMENT CONSTRAINTS

Runway and Taxiway Setbacks

Required setback distances from a runway and parallel taxiway were discussed in the preceding chapter. The standards applicable to Porterville Municipal Airport are those of a Transport category runway intended to accommodate aircraft with wingspans over 79 feet and approach speeds over 121 knots. As discussed in the previous chapter, the Transport classification is appropriate because of the fire attack aircraft (e.g., DC-6) which operate from the Airport each summer.

TAXIWAY CLEARANCE REQUIREMENTS

FAA standards require that the areas adjacent to taxiways be free of aircraft or other objects which could be an obstacle. The boundary of this clear area is termed the "aircraft parking limit" line. The clearance required is dependent upon the wingspan of the most demanding aircraft expected to use the taxiway – in this case the C-130 is the critical aircraft. For the parallel taxiway, the aircraft parking limit line is 106 feet from the taxiway centerline. A significant portion of the existing aircraft parking apron falls within the aircraft parking limit line. Eighteen existing aircraft tiedown positions must be eliminated in order to meet the FAA clearance standard.

Taxilanes are secondary taxiways which provide access to hangars, tiedowns, and fixed base operations. The clearance requirements for taxilanes are slightly less than those for taxiways. The aircraft parking limit line for the taxilanes used by fire attack aircraft is 90 feet from the centerline. For the other taxilanes on the airfield the requirement is 42.5 feet from centerline.

HANGARS AND TIEDOWNS

An essential element of any airport master plan is identifying sites for additional hangars and tiedowns. There are forecast to be 150 aircraft based at Porterville Municipal Airport in the year 2008. Currently 45% of the based aircraft are stored in hangars (including shade hangars). This is expected to increase to 55% over the next 20 years. This means that a total of 83 hangars and 67 tiedown positions will be needed by 2008. There are currently 38 aircraft storage hangars on the airfield. The existing aircraft parking apron and private tiedown positions can accommodate 50 aircraft assuming:

- No aircraft are parked beyond the aircraft parking limit line.
- None of the transient parking apron is used for based aircraft.
- The existing spacing between rows is retained. This spacing is slightly tighter than standard, but has apparently proved to be acceptable to local pilots.
- Those tiedowns which are presently aligned parallel to the runway are reoriented to match the placement of the majority of the rows.
- The taxilane in front of Porterville Aviation is extended out to the parallel taxiway to enable complete utilization of the existing ramp.

Therefore, space for 45 new hangars and 17 new tiedowns needs to be identified. It is recommended that these be accommodated by creating a new aircraft storage area on City-owned land previously released as airport property. This new area is located across the hangar access road from the existing rows of hangars. As standard-sized hangars require the same spacing as tiedowns, either could be accommodated. The decision of which to construct can be left until there is a demand for additional aircraft storage.

The layout planned for this parcel will provide small plots at the end of most rows of T-hangars. Small box or portable hangars can be accommodated on these sites. This design flexibility is important, as most of the hangars are expected to be developed privately. Larger hangars can be developed along the taxilane which provides access to this area. The site has been designed to permit larger aircraft to be parked in front of their hangars without blocking the access taxilane.

HELIPADS

Several times a week Porterville Municipal Airport is used by transient helicopters. Users include the California Highway Patrol, the California Department of Forestry, the U.S. Army, and Southern California Edison. This level of use is high enough to warrant construction of a public helipad for their use. The current practice is for arriving helicopters to land on the main apron (if it is not occupied with fixed-wing aircraft) or in the dirt areas adjacent to the main apron. This has resulted in some problems because of dust and debris blown onto parked aircraft by helicopters.

A helipad should provide convenient access to the terminal area (restaurant, rest rooms, etc.) while being distant enough from aircraft parking positions to minimize problems with blown dust. The helicopter touchdown point should be sited so that helicopters will be at least 100 feet above parked aircraft during landings and departures.

The site which best meets these criteria (as well as the FAA's technical requirements) is located immediately northwest of the transient parking apron (Figure 1). A touchdown site will be painted on the parallel taxiway. Two helicopter parking pads will be constructed adjacent to the touchdown site to assure that parked helicopters do not extend past the aircraft parking limit line. A short connecting taxilane should be constructed to accommodate taxiing by wheeled helicopters. The central portion of the helipads should be constructed of portland cement concrete. This will minimize the long-term cost of maintaining the pads. Asphaltic concrete is subject to rutting from helicopter skids and can be more readily damaged by the turbine fuel used by most helicopters. The area adjacent to the helipad should be stabilized with turf.

A helipad site has been designated adjacent to the fire attack base. It is intended that this helipad would be for the sole use of the California Department of Forestry, the U.S. Forest Service, and contractors associated with the fire attack base. It is presumed that the heliport would be constructed using funds from the agencies associated with the fire attack base. The design is substantially the same as the public use heliport.

SECURITY FENCING

The primary purpose of security fencing at a general aviation airport is to keep unauthorized vehicles from driving onto the active airfield, whether deliberately or unintentionally. A fencing and gate system will also make it more difficult for unauthorized individuals to enter the airfield; it will not prevent entry.

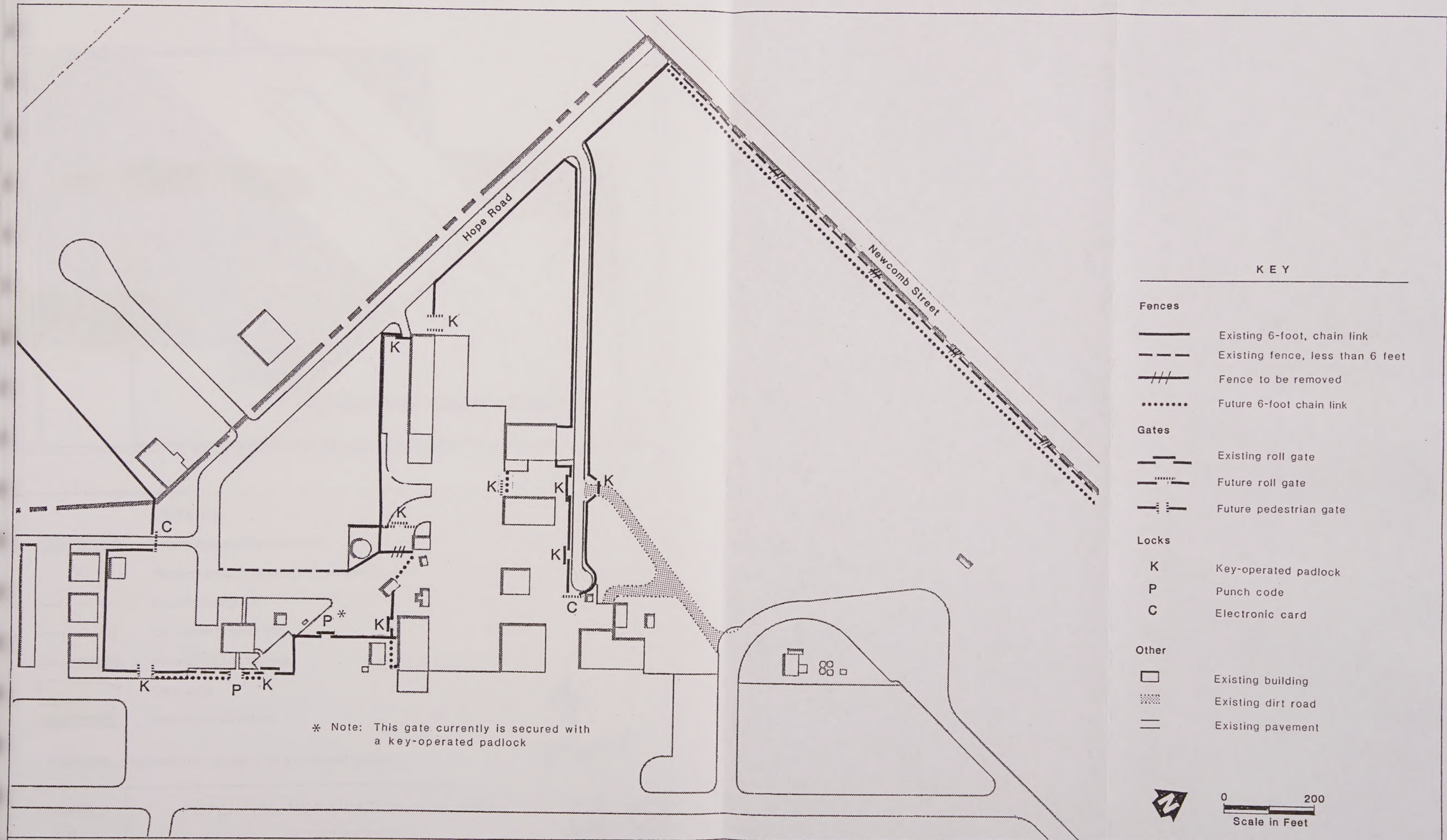
Porterville Municipal Airport has had occasional problems with automobiles driving on the runway and fuel syphoning. Over time it will be appropriate to incrementally increase the level of security on the airfield though the addition of fences and gates. Proposed fence and gate locations are specified on the Airport Layout Plan (Figure 1) and the Core Area Fencing Plan (Figure 11).

LAND REQUIREMENTS FOR AVIATION

When evaluating the land requirements for aviation uses at Porterville Municipal Airport, it is important to appreciate the fact that an airport's useful life is essentially unlimited. To an even greater extent than other major public facilities (e.g., waste water treatment plants, dams, and highways), a very long term perspective is essential to making decisions on land requirements. This perspective should be used when one considers reducing the amount of land available for aviation uses.

Three alternative patterns of use for the Porterville Municipal Airport were developed (Figures 12, 13, and 14); one for each of the Runway 7-25 alternatives presented in Chapter 7. On each figure, the land available for commercial or industrial uses unrelated to aviation is outlined. The balance of the airport land is required for aviation uses or nonaviation uses which support the airport (e.g., restaurant). The differences between the three versions reflect the effects of alternative roles for the abandoned runway and taxiway. For each alternative, a sequence of development is recommended. The principal rationale for the sequence is to preserve the options available to aviation uses for the longest period possible.

Figure 13 is the recommended alternative, based upon the decision to preserve the option of reopening a portion of Runway 7-25 as a taxiway (Chapter 7). The FAA should not be requested to authorize the release of additional lands until those lands previously released are substantially committed. The funds acquired though the sales of surplus lands must be used for airport projects which are eligible for FAA grants.



CORE AREA FENCING PLAN

FIGURE 11

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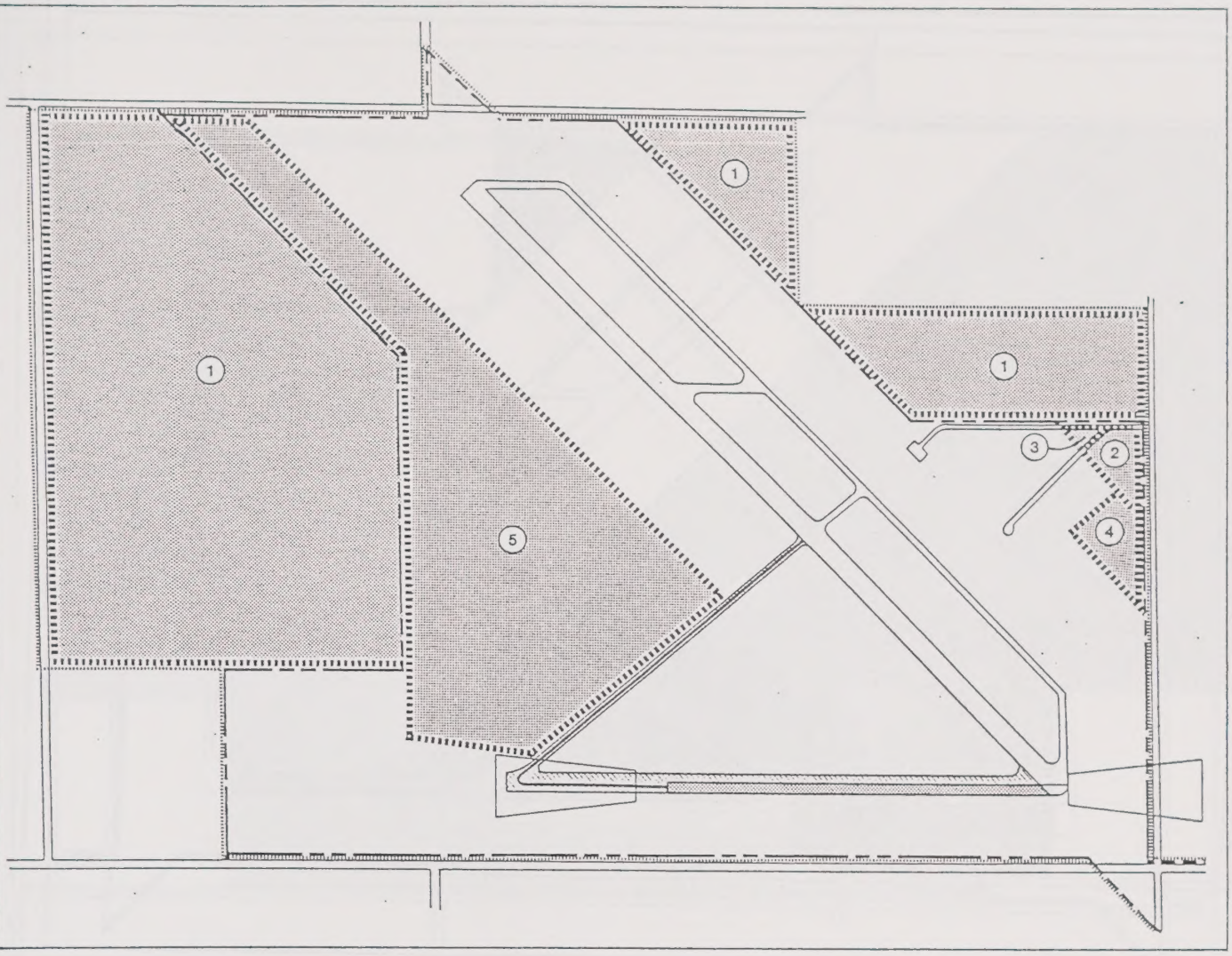

LEGEND

- Potential nonaviation use areas
- (5) Recommended sequence of development
- Airport property line
- City owned property line
- Runway 7-25 and taxiway
- Clear zone
- Abandoned pavement

ASSUMES: Reactivation of Runway 7-25 and midfield taxiway

N

0 1,500

Scale in Feet

FIGURE 12

POTENTIAL NONAVIATION USE AREAS
ALTERNATIVE 1

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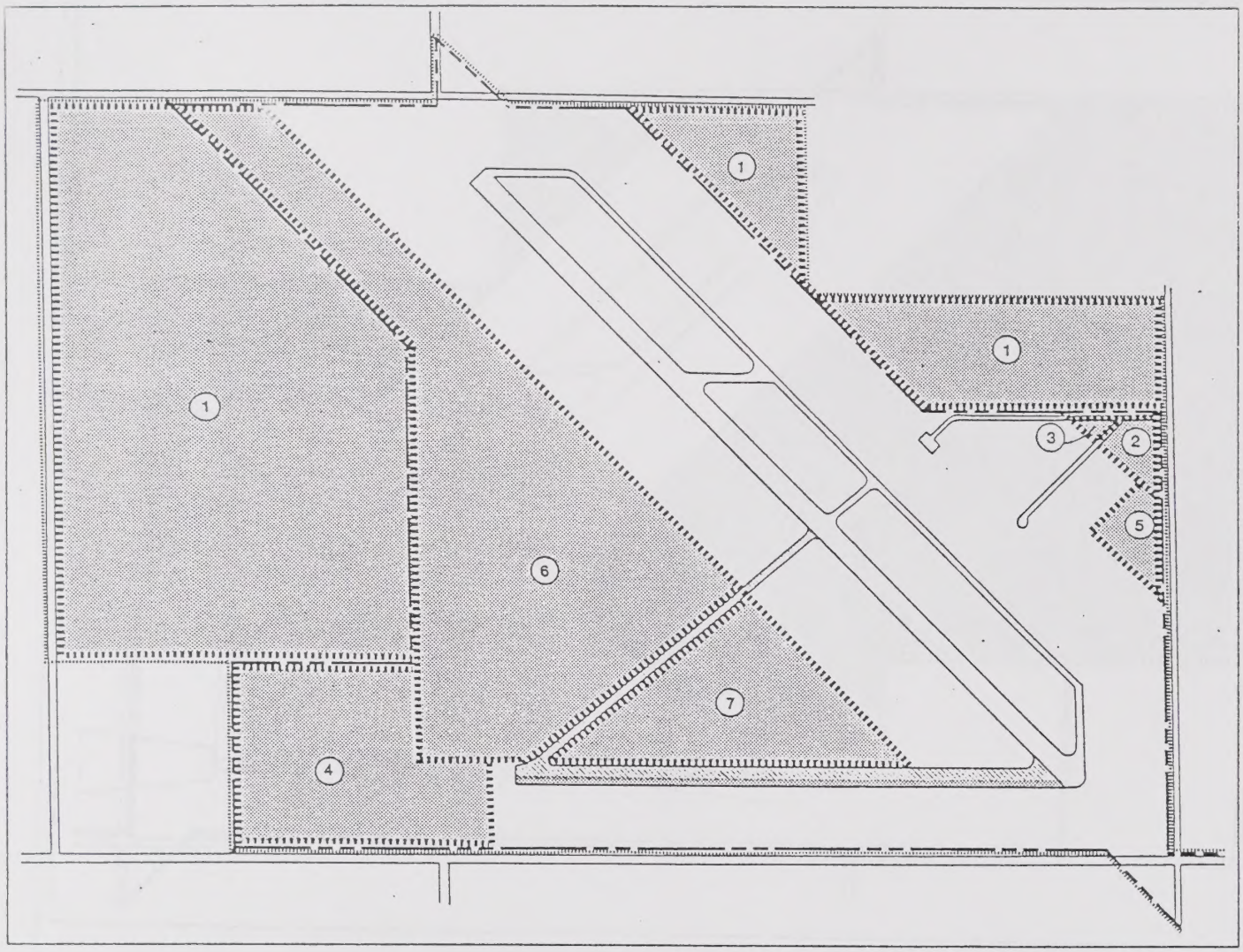

LEGEND

Potential nonaviation use areas

(5) Recommended sequence of development

Airport property line

City owned property line

New taxiway

Abandoned pavement

ASSUMES: Reuse of a portion of runway pavement as a taxiway.

N

0 1,500

Scale in Feet

FIGURE 13	POTENTIAL NONAVIATION USE AREAS ALTERNATIVE 2

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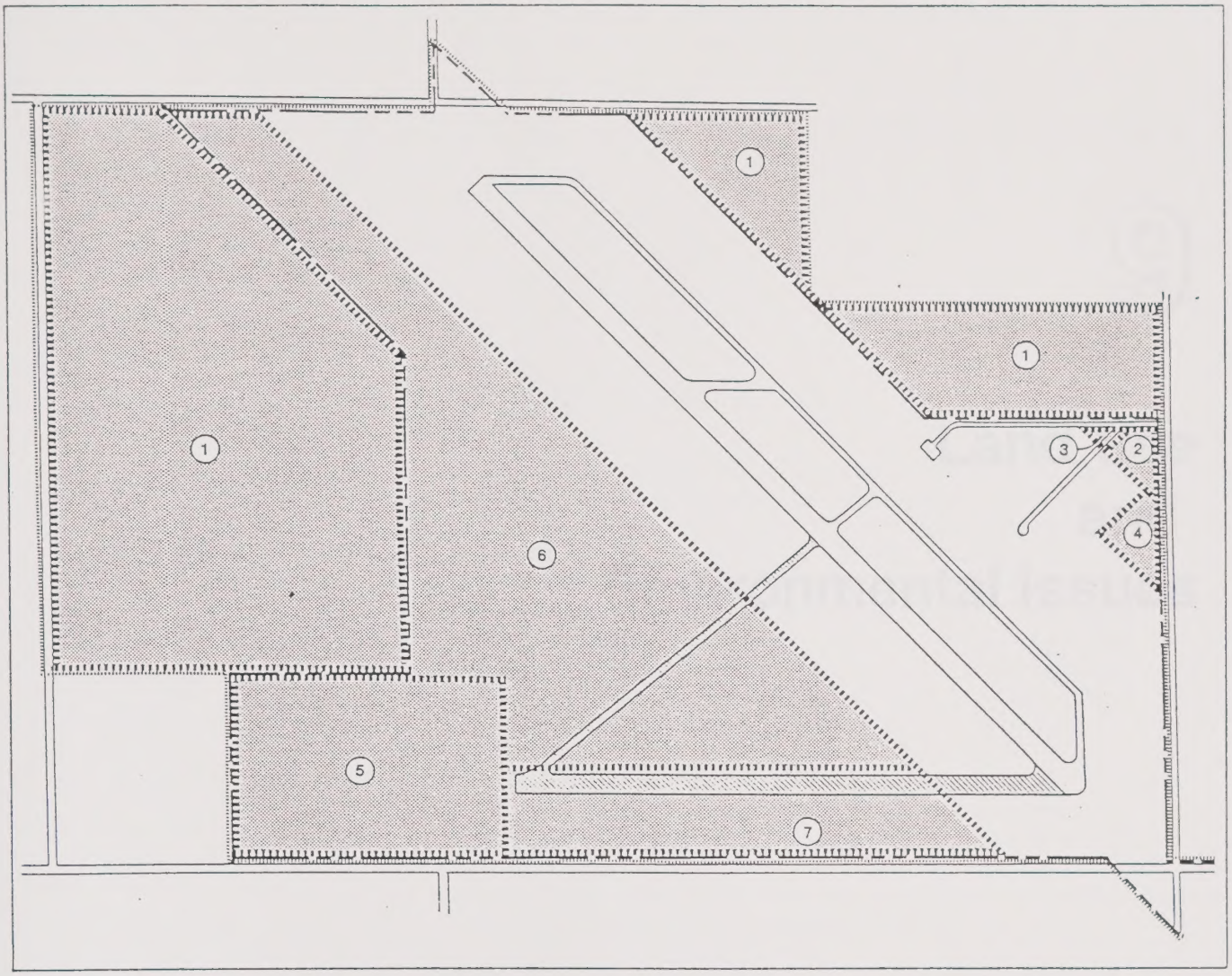

LEGEND

Potential nonaviation use areas

(5) Recommended sequence of development

Airport property line

City owned property line

Abandoned pavement

N

0 1,500

Scale in Feet

ASSUMES: Reuse of a portion of runway pavement as a taxiway

FIGURE 14

POTENTIAL NONAVIATION USE AREAS
ALTERNATIVE 3

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9

Land Use and Environmental Issues

9

LAND USE AND ENVIRONMENTAL ISSUES

NATURE OF IMPACTS

The issue of compatibility between a general aviation airport, such as Porterville Municipal, and its surrounding land use can be addressed in terms of three major considerations: Noise impacts, hazards to flight, and safety on the ground. The issue with regard to noise is clear – noise is often perceived to be the most significant of the adverse impacts associated with airport activity. The concern with respect to flight hazards is to avoid land use conditions that could cause an accident. On the other hand, the objective in providing safety on the ground is to reduce the risks – to the occupants of aircraft as well as to people on the ground – in the event that an accident occurs.

In addition to these three primary considerations, there is a fourth one, less well defined, that warrants examination. This is the issue of annoyance associated with overflights by aircraft. This impact seems to result from a combination of factors: Noise and the fear element associated with the risk to people on the ground.

Noise Impacts

Noise can be described as an unwanted or disruptive sound. Two basic elements determine whether a sound is perceived as disruptive: (1) characteristics of the sound itself and (2) the human activity taking place when the sound occurs.

The principal characteristics of sound are its loudness (amplitude) and frequency (pitch). The standard measure of loudness is the decibel (dB). The frequency of a sound is significant because the human ear is not equally sensitive to all frequencies. To reflect this varying sensitivity, an A-weighted decibel scale (dBA) is typically used to measure the perceived loudness of a sound.

In order to measure the noise value of a sound, it has been found that other factors also must be considered. To take such factors into account, various composite noise descriptors have been devised. The descriptor most commonly used in California to measure noise generated by aircraft operations at an airport is the Community Noise Equivalent Level (CNEL). Inputs to the calculation of CNEL contours include the sound level transmitted by individual operations of each aircraft type using the airport, the number of operations by aircraft

type, the time of day when the operations occur, runway utilization, aircraft flight track geometry, and the takeoff and landing profiles of each aircraft type.

The type of human activity is a factor in determining the disruptiveness of a noise because a noise level which may be disruptive to one type of activity may be acceptable with respect to another. Various studies have been done to ascertain the decibel level at which noise will interfere with a given activity. These data in turn have been used to establish relationships between acceptable or unacceptable composite noise levels and specific types of land uses.

The type of land use most often of greatest concern with regard to airport noise impacts is residential. Not only are residential uses more susceptible to noise impacts than most other types of land use, but residential or potential residential uses frequently occupy the largest percentage of land in the environs of an airport. Many federal, state, and local agencies have established a standard for the maximum acceptable noise level in a residential area. The most common standards are a CNEL (or equivalent) of 60 or 65 dBA.

State of California airport noise standards, as well as Federal Aviation Regulations (Part 150), establish a CNEL of 65 dBA as the maximum acceptable noise exposure for residential land uses. This criterion, however, is set primarily with regard to major air carrier airports in relatively noisy urban locations. For most airports, especially those in less noisy suburban or rural settings, a 60-CNEL standard is suggested. Some of the most rural communities utilize a value as low as 55 dBa.

Hazards to Flight

Two types of potential hazards to flight are of concern: Physical obstructions to the navigable airspace and, secondly, other land use characteristics that can affect flight safety.

In order to safeguard an airport's long-term usability, preventing encroachment of objects into the surrounding airspace is imperative. Standards for the maximum allowable height of structures and other objects around airports are set forth in Part 77 of the Federal Aviation Regulations, "Objects Affecting Navigable Airspace". These standards reflect, with a margin of safety, the lowest altitudes at which an aircraft might reasonably be flown while approaching or departing an airport. The regulations require that the Federal Aviation Administration be notified regarding the proposed establishment of any object that would exceed the specified heights. Enforcement of the regulations is a local responsibility - beyond the notification procedure, the FAA has no direct power to enforce the regulations or prohibit obstructions from being created. The FAA nonetheless has two significant indirect powers with regard to airspace protection: (1) it can restrict the use of an airport if hazardous obstructions are deemed to exist, and (2) if the owner of an airport has not taken all reasonable steps to prevent such obstructions, the FAA can find the airport to be in noncompliance with conditions for the receipt of federal airport improvement funds and make it ineligible for future grants.

Other land use characteristics can also affect flight safety. The characteristics can be visual, electronic, or physical in nature. Visual hazards include distracting lights (particularly lights which can be confused with airfield lights), glare, and sources of smoke. Electronic hazards include any uses which interfere with aircraft instruments or radio communication. The principal physical hazards, other than the height of structures, are bird strikes. Although the risk of bird strikes is most serious along the corridors required for takeoffs and landings, the concern extends to elsewhere in the airport vicinity. Any land uses which can attract birds should be avoided, but those which are artificial attractors are particularly inappropriate because they generally need not be located near airports.

Safety on the Ground

A primary means of limiting the risks of near-airport aircraft accidents is to limit the density of land use development. There are two aspects to such limitations – a limit on structural coverage and a limit on the number of occupants. The former relates primarily to protecting people in an aircraft, whereas the latter involves the concern for people on the ground. Precedents for setting density limitations come from individual county airport land use commissions in California; Federal and State regulations provide no quantifiable guidance except in regard to clear zones.

Accident probabilities increase with closer proximity to the runway ends in large part because of the greater concentration of aircraft over a given area. The risk is also greater because at low altitudes a pilot has little choice over where to make an emergency landing. At an altitude of 400 feet or above, fairly wide discretion is possible and, near the traffic pattern altitude, a landing at the airport should be possible. Greater restrictions are thus advisable within the clear zones and approach zones than in other parts of an airport environs.

Clear Zones: FAA standards suggest that all clear zone property ideally should be airport owned and free of structures. If this condition is impractical, then lesser measures – easements or zoning regulations – to at least restrict heights of structures and trees may be adequate.

Approach Zones: Within the approach zones and adjacent low-altitude overflight areas, it is desirable to have as much open land as possible and to minimize the number of people occupying the area. Where development occurs, clustering maximizes the amount of open space useful for emergency landings. To protect against the comparatively unlikely chance that an aircraft accident would occur in the development cluster, a maximum net occupancy level can be set. FAA policy recognizes the importance of the area surrounding runway clear zones by making acquisition of property interests therein eligible for Federal grants. For the (existing) transport category runway at Porterville Municipal Airport, the acquisition-eligible approach areas extend 1,250 feet laterally from the runway centerline and 5,200 feet beyond each runway end. Although these dimensions are "considered as desirable minimums", acquisition of parcels totally outside these limits is not normally grant eligible for compatibility purposes.

Traffic Pattern Area: Within the balance of the traffic pattern area, aircraft normally will be at altitudes greater than 400 feet above the Airport. Evenly distributed emergency-landing-site open spaces are adequate safety measures in these locations. Open land can be accomplished by clustering or other means of designating open space.

Annoyance Associated with Overflights by Aircraft

Compared to the preceding airport/land use compatibility considerations, the annoyance factor of airport activity is more subtle and subjective. It arises in locations where neither noise nor safety is measurably a significant factor – the noise of aircraft overflights seldom disrupts people's activities and the risk of an aircraft accident is statistically very low. Moreover, the degree of perceived nuisance varies widely from individual to individual even though the definable impacts may be similar.

One explanation of annoyance impacts is that they result from a combination of noise and safety concerns with fear being an element of the equation. Although people generally do not fear aircraft noise itself, they may be fearful of an aircraft crashing down on their property, and it is the noise that mostly creates their awareness of aircraft presence. The occurrence of annoyance impacts thus appears to be influenced by several factors related to the individuals affected – their attitudes toward aviation including their feelings regarding the importance of the particular activity, their understanding of how airplanes fly, and their knowledge of when and how often overflights occur – as well as by the actual noise levels and the altitude of the aircraft.

A policy implication of these factors is the importance of education. Owners of property near an airport should be made aware of the nature and extent of the airport's activity and the plans for its future. Additionally, it is particularly important that a mechanism be established which will assure that prospective buyers or property in the airport area receive this information.

AGENCIES WITH AUTHORITY OVER LAND USE

Full implementation of the recommended airport compatibility measures wil require action by three local agencies: The City of Porterville, Tulare County, and the Tulare County Airport Land Use Commission. The section which follows describes the geographic extent and regulatory authority of each of these agencies.

City of Porterville

Only a portion of the land surrounding the Porterville Municipal Airport currently lies within the incorporated limits of the City of Porterville. As an incorporated city, Porterville has broad statutory authority over development of land within its jurisdiction. The staff of the Porterville Planning Division reviews land use proposals and provide comprehensive recommendations to the City Council.

Ultimate responsibility for decisions on land use resides with the City Council. Implementation of the adopted plans, policies, and project-specific decisions of the City Council is accomplished by the Planning Department.

Tulare County

Tulare County's land use planning authority over the unincorporated areas parallels in scope that of the City of Porterville. The Tulare County Board of Supervisors, Planning Commission, and Department of Building and Planning perform the same roles as their counterparts in Porterville. Even after the City of Porterville has annexed all of the land within its project urban limits, a substantial amount of the land around the Airport will remain under County jurisdiction.

Tulare County Airport Land Use Commission

As the purpose and powers of airport land use commissions (ALUC's) are less well known that those of cities and counties, it is appropriate to provide a brief overview of the legal basis for this agency. The statutory authority for the establishment of airport land use commissions is provided in the California Public Utilities Code, Sections 21670 et seq. (Chapter 4, Article 3.5 of the State Aeronautics Act). Every county in which there is located an airport "operated for the general benefit of the public" is required (with limited exceptions) to have an airport land use commission.

The purpose of the article and the reason for the creation of the commissions is expressly stated as being:

.. to protect public health, safety, and welfare by ensuring the orderly expansion of airports and the adoption of land use measures that minimize the public's exposure to excessive noise and safety hazards within areas around public airports to the extent that these areas are not already devoted to incompatible uses.

Among the required duties of each commission is to formulate a comprehensive land use plan intended to achieve the above purpose. The plan must address each public airport within the commission's jurisdiction and its time frame must be long-range. It may include height restrictions, specify land uses, and determine building standards. The Tulare County ALUC has not yet prepared a comprehensive land use plan, although a set of compatibility policies have been adopted.

Under provisions of the law added in 1982, either local general plans and specific plans must be made consistent with the airport land use commission plan or the governing body of the local jurisdiction must take specific steps to override the commission. The steps to override include making specific findings that the proposed action is consistent with the purposes of the article and passage by a two-thirds vote. Once consistency has been achieved or an override has been approved, individual land use development projects need no longer

be reviewed by the commission unless the commission and the local jurisdiction agree that such review be continued.

The membership for an ALUC can be either appointed specifically to serve on the Commission or an existing governmental body can be designated. In 1976 the members of the Tulare County Planning Commission were designated as the ALUC by joint action of the Tulare County Board of Supervisors and the mayors of the Cities of Visalia, Porterville, and Tulare. In 1988 two members were added with expertise in aviation in response to changes in State law.

EXISTING PLANS AND POLICIES

This section describes the adopted plans and policies which currently guide development in the vicinity of Porterville Municipal Airport. Ongoing efforts which may result in changes to the existing plans and policies are also noted.

Porterville General Plan (1987)

The principal guidance provided in this plan is contained in the Land Use and Circulation Element. The dominant land use designation in the areas adjacent to the airport is Industrial. Along the arrival/departure flight paths Agriculture is the sole use. There is also a small amount of Highway Commercial within the Airport's environs. The nearest Residential uses are located east of Highway 65.

The land use designations proposed in the 1987 plan may be modified as a result of the ongoing review of proposed amendments to the Porterville and Tulare County General Plans. A key factor in the review is the recently released Porterville Biotic Analysis. Amendments to the two General Plans could have a profound effect on the long-term compatibility between the Porterville Municipal Airport and its environs.

As the City of Porterville adopted the Noise Element developed by Tulare County with only minor modifications, it will be discussed under the section on the Tulare County Noise Element.

Tulare County General Plan (1966)

The original (1966) land use designations have been superseded by subsequent amendments – the most recent revisions occurred in 1982 and 1987. The land use designations contained in the Land Use and Circulation Element (including the Rural Valley Lands Plan) are supported by policies on infrastructure development in the Water and Liquid Waste Management Element. Except for those lands within the City's proposed Urban Development Boundary, all of the unincorporated areas surrounding the Porterville Municipal Airport is designated for agricultural uses, which are generally compatible with airport activities.

Tulare County Aviation Element and Airport System Plan (1985)

This plan provides guidance on the role of each of the airports within Tulare County. Porterville Municipal Airport is identified as the airport which can best serve southeastern Tulare County. The Plan supports the upgrading of Porterville Municipal Airport to Transport category.

Tulare County Noise Element (1988)

The current version of the Tulare County Noise Element was also adopted by the City of Porterville with only minor modification. The Noise Element provides general guidance on management of noise from a variety of sources including airports. The Noise Element would exclude new residential or other noise-sensitive land uses within the 60 CNEL contour produced by public airports.

Tulare County ALUC Policies (1976, 1977 and 1986)

Although the Tulare County Airport Land Use Commission has not yet adopted a comprehensive compatibility plan for Porterville Municipal Airport, it has adopted a number of policies to guide its evaluation of land use proposals. The "radii of review" around the public use airports in Tulare County is defined to be the land underlying the Part 77 surfaces adopted for each airport. The policies seek to minimize population density within approach zones and high noise areas. Additionally, the policies seek to prevent actions which would interfere with the use of public airports. Examples of prohibited actions include erection of structures which would penetrate the Part 77 surfaces and activities which might produce electrical interference.

EXISTING DEVELOPMENT

There currently exists a high degree of compatibility between Porterville Municipal Airport and its environs. Agricultural uses predominate, with citrus orchards being the most common. Several industrial or heavy commercial uses are located immediately adjacent to the Airport. An off-road vehicle raceway lies on land bordering the Airport. There is a limited amount of residential development with the greatest concentrations along Westwood Avenue (Road 224) and Road 236.

FUTURE DEVELOPMENT

The 1982 amendment to the County General Plan designated 20- and 10-acre minimum parcel sizes for the agricultural lands near the Airport. However, the existing five-acre zoning was not brought into conformance with the new General Plan designations. Therefore, it

continues to be possible to create five-acre parcels in agriculturally-designated lands north and east of the Airport.

This residential development is the only major threat to the continued compatibility of the Porterville Municipal Airport with its environs. Residential uses are inherently undesirable in the vicinity of an airport. In an area where agriculture continues to be a vigorous, commercially-viable activity, it is inappropriate to permit the creation of residential parcels.

The City of Porterville and Tulare County are jointly considering amendments to their respective general plans. This presents an opportunity to prevent the creation of additional five-acre residential lots.

CURRENT AND PROJECTED AIRPORT IMPACTS

The extent of the impacts which an airport has upon surrounding land uses is determined by the configuration of the airfield, its flight patterns, and by the type and volume of its air traffic. The four specific considerations in compatibility planning are:

- Noise impacts
- Safety on the ground
- Hazards to flight
- Annoyance associated with overflights

Noise

The most common way of quantifying noise impacts in California is to develop Community Noise Equivalent Level (CNEL) contours. The current and projected noise impacts generated by Porterville Municipal Airport are presented in Figures 15 and 16. The aircraft operations volumes and other data employed in calculating the contours are summarized in Appendix C.

The size of the noise contours at Porterville is largely determined by the operations of the fire attack aircraft. This is highlighted by the fact that the contours projected for 2008 are slightly shorter than those for 1988, in spite of an overall increase in operations. This reduction is linked to the anticipated replacement of DC-4/6/7's with the C-130 – a slightly quieter aircraft.

Safety

The principal means of assuring safety to those on the ground is to limit the density of people in the Airport's environs. Densities should be lowest where aircraft on instrument approaches will be below 400 feet above ground level (AGL). Densities should also be limited where aircraft will be below 800 feet AGL in the landing and departure pattern. Preserving open areas in the vicinity of the Airport is also useful. Once an aircraft reaches 400 feet AGL, fairly wide discretion in selecting an emergency landing site is possible.

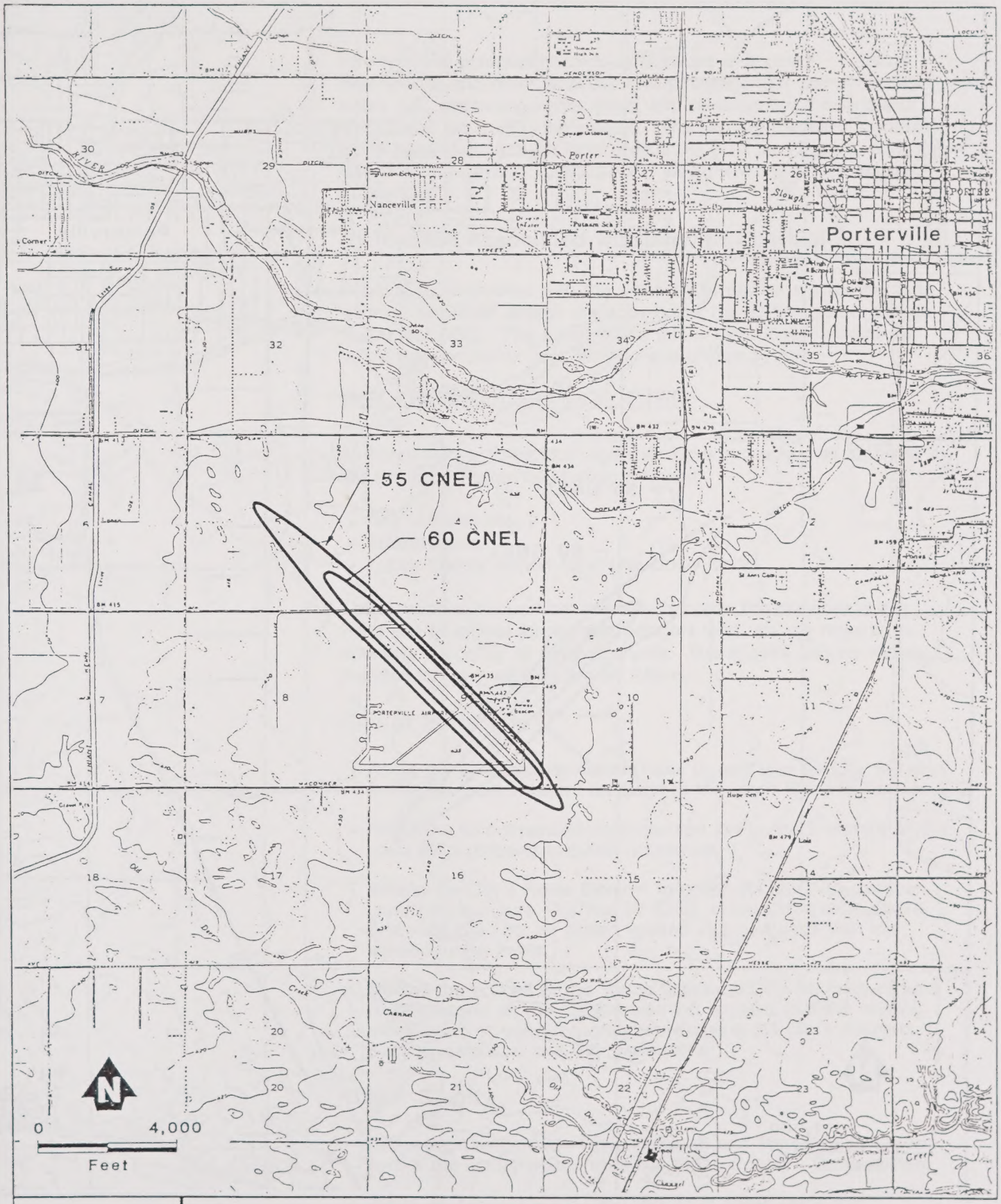

FIGURE 15

NOISE CONTOURS: 1988

HODGES & SHUTT

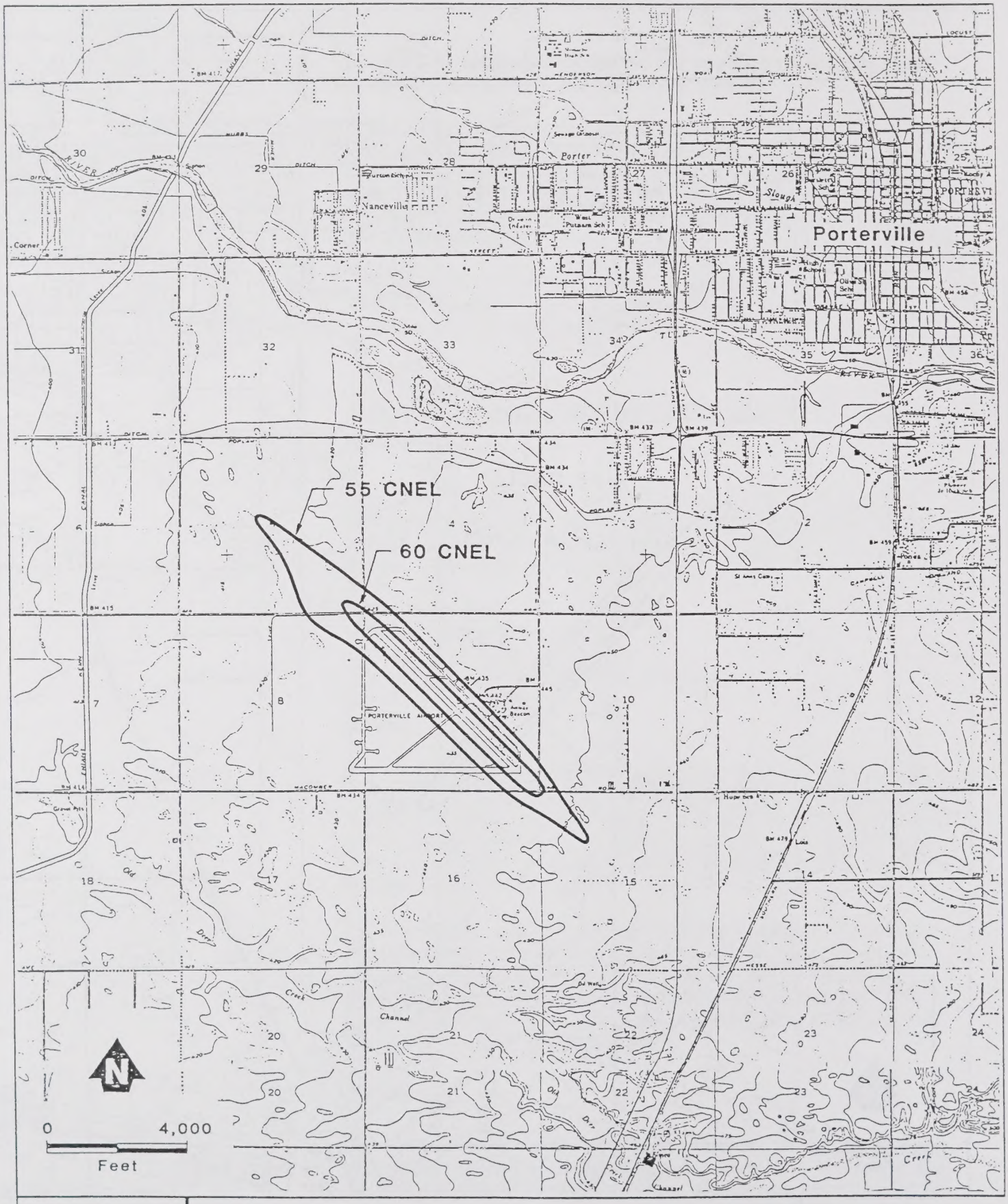

FIGURE 16

NOISE CONTOURS: 2008

HODGES & SHUTT

Two types of potential hazards to flight are of concern: Physical obstructions and other land use characteristics that can affect flight safety (i.e., distracting lights, glare, bird attraction, and sources of smoke and electronic interference). The primary means of controlling these hazards is through local ordinances. To be effective, both the City of Porterville and Tulare County would need to adopt parallel ordinances.

Annoyance Associated with Aircraft Overflights

Annoyance associated with the overflight of aircraft is reasonable to address whenever aircraft are at or below the traffic pattern altitude (1,000 feet AGL). The areas where this is most likely to occur is below the commonly used landing and departure paths.

RECOMMENDED POLICIES

As noted above, three local agencies have authority over land use in the vicinity of Porterville Municipal Airport:

- City of Porterville
- Tulare County
- Tulare County Airport Land Use Commission

Assuring the continued compatibility between the activities at the Porterville Municipal Airport and adjacent land use will require co-operative action by all three agencies. The specific actions recommended for each agency are as follows:

City of Porterville

- Adopt the Compatibility Table (Table 9) and Map (Figure 17) as part of the contemplated revisions to the City's General Plan.

- Adopt the recommendations presented in Figures 9 and 10 as the basis for a property acquisition program.

- Amend the City's Noise Element to utilize the 55 CNEL contour contained in Figure 18. The 55 CNEL contour is a more appropriate standard for an airport located in a rural area with low ambient noise levels.

- Monitor the actions of the Tulare County ALUC. Formally request representation on the Commission if it appears that the existing membership is not adequately representing the City's interests. Such presentation is a City prerogative.

Tulare County

- Adopt the Compatibility Table (Table 9) and Map (Figure 17) as part of the contemplated revisions to the County's General Plan.

- Adopt an Airport Height Limitation Zone based upon the Approach and Clear Zone Plan for the Porterville Municipal Airport.

- Amend the County Noise Element to utilize the 55 CNEL contour for Porterville Municipal Airport.

Tulare County Airport Land Use Commission

Adopt the Compatibility Table (Table 9) and Map (Figure 17) as the Land Use Compatibility Plan for the Porterville Municipal Airport.

ENVIRONMENTAL IMPACTS OF AIRPORT DEVELOPMENT

An Environmental Impact Report has been prepared for the Airport Master Plan and the proposed nonaviation development on Cit wned property adjacent to the Airport.

Table 9

COMPATIBILITY CRITERIA

ZONE	LOCATION	IMPACT ELEMENTS	MAXIMUM DENSITIES RESIDENTIAL (ac/du)[1]	OTHER USES (people/ac)[2] In Structures	Not In Structures	REQUIRED OPEN LAND[3]	PROHIBITED USES	OTHER DEVELOPMENT CONDITIONS[4]	EXAMPLES OF NORMALLY ACCEPTABLE USES[5]	EXAMPLES OF USES NORMALLY NOT ACCEPTABLE[6]
A	o Clear Zone or Primary Surface	o High risk o High noise	0	0	10	All Remaining	o Any assemblage of people o Any new structure which exceeds FAR 77 height limits o Any noise sensitive uses	o No uses hazardous to flight[7]	o Pastures, open space o Aircraft tiedowns o Auto parking	o Heavy poles, signs, large trees, etc.
B	o Inner Approach/Departure Zone	o Substantial risk -- Low overflights along extended runway centerline o High noise	0	10	25	All Remaining	o All types of residential o Any noise sensitive uses o Schools, libraries, hospitals, nursing homes o Uses involving highly flammable materials	o Structures to be as far as possible from extended runway centerline o Minimum NLR[8] of 25 dBA in residential and office buildings o No uses hazardous to flight[7]	o Parks with low-intensity uses o Nurseries o Mini-storage	o Retail stores
C	o Outer Approach/Departure Zone - or - o Turn to Base Leg	o Substantial noise o Moderate risk -- either: (1) Routine overflight on instrument approach below 400' AGL or (2) below pattern altitude on visual approach	20	25	50	15%	o Schools, libraries, hospitals, nursing homes o Noise sensitive outdoor activities	o Residential structures, especially mobile homes, to have a minimum NLR of 20 dBA o Clustering of development is encouraged o No uses hazardous to flight[7]	o Warehousing o Low-intensity light industrial o Auto dealerships o Small retail establishments (e.g. convenience markets, small drive-up restaurants)	o All types of residential o Large retail buildings o Motels
D	o Common Flight Tracks	o Small risk o Frequent noise intrusion	20	60	120	1/2 mile		o None except overflight easement dedication requirement for residential development	o Single-family residential	o Highly noise sensitive outdoor activities; e.g. amphitheaters
E	o Other Airport Environs	o Overflight nuisance	--	--	--	--		o None except deed notice requirement for any residential development indicating proximity to airport and possibility of overflights	o Any	

NOTES

1 Residential parcels smaller than the indicated number of acres should not be created.

2 The use should not attract more than the indicated number of persons per net acre averaged over an 8-hour period. No more than double the indicated number of persons per acre is permitted at any time or within any acre of area.

3 The indicated percentage of gross area should remain free of structures and other major obstacles. A distance in lieu of a percentage means that open areas of the required size should be spaced at approximately the indicated distance apart. To be considered open land the area must be sufficiently large and unobstructed to enable an aircraft to make an emergency landing with a high probability of no serious injuries to the occupants of the aircraft or major damage to structures on the ground. The minimum size for such areas is 100 feet wide by 300 to 500 feet long. These areas should be oriented as closely as practical to the common direction of aircraft flight over the area.

4 Dedication of an overflight easement is required as a condition for new residential development within all zones.

5 These uses typically can be designed to meet the density requirements and other development conditions listed.

6 These uses typically do not meet the density requirements and other development conditions listed. They should be allowed only if a major community objective is served by their location in this zone and no feasible alternative location exists.

7 See Safety section in text for details.

8 NLR = Noise Level Reduction; i.e. the attenuation of sound level from outside to inside provided by the structure.

Revised 11/18/88

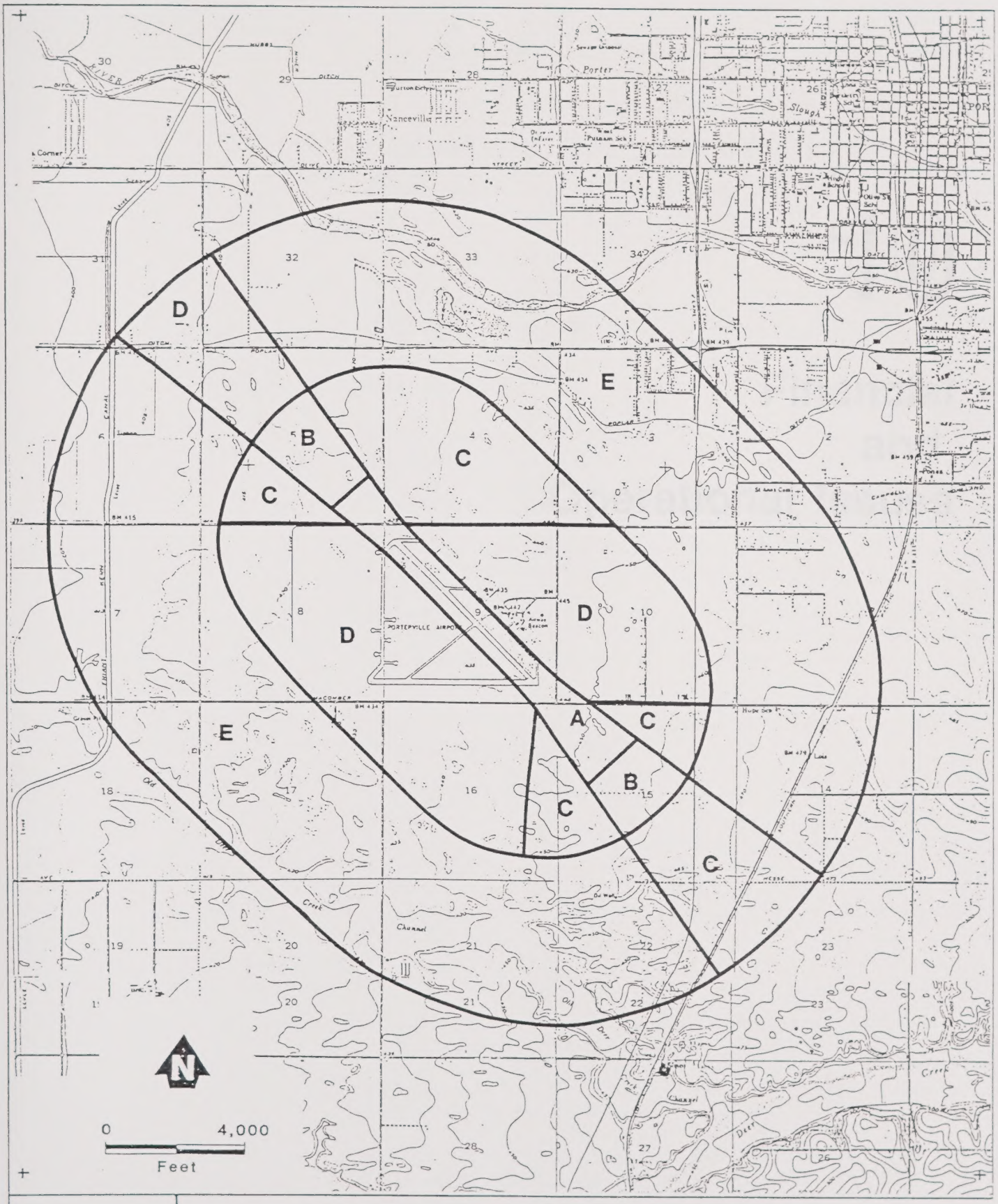

FIGURE 17

COMPATIBILITY MAP

HODGES & SHUTT

10

Financial and Operational Issues

10

FINANCIAL AND OPERATIONAL ISSUES

CAPITAL IMPROVEMENT PROGRAM

Cost Estimates

Table 10 sets forth cost estimates (based on 1988 dollar values) for proposed airport development at the Porterville Municipal Airport over the next twenty years. The estimates are tabulated in three stages (0-5 years, 5-10 years, and 10-20 years) consistent with the anticipated project implementation sequence. It should be emphasized that these costs have been estimated on an order-of-magnitude basis for preliminary planning and programming purposes only.

Specific project analysis and detailed engineering design will be required at the time of project implementation to provide more refined and up-to-date cost estimates of developmental costs.

As presented in Table 10, the Master Plan projects a total Capital Improvement Program cost of approximately $4.2 million over the twenty-year planning period.

Capital Funding Sources

There are a variety of sources from which funding and financing for municipal airport facilities and improvements can be obtained. These sources generally include federal grants, state grants and loans, municipal airport owner funding, private investment, and airport self-financing.

Federal Grants

The most common source of federal aid for airport facilities is currently the Airport Improvement Program (AIP) administered by the Federal Aviation Administration. The AIP, re-established in 1987, is the latest evolution of a program originally authorized by Congress in 1946 as the Federal Aid to Airports Program (FAAP).

The AIP is based upon a trust fund concept, allocating aviation-generated tax revenues for specified airport facilities on a local matching share basis. The program currently provides for 90% federal participation and 10% local participation on most projects in California. Historically, the local match requirement has ranged as high as 50%. There is some uncertainty, however, as to whether the relatively generous 10% local match requirement currently being

Table 10

CAPITAL IMPROVEMENT PROGRAM

	Costs (in 1989 $ values)		
	Total	FAA/CAAP	City
Short-Term Projects (within 5 Years)			
Runway 12-30 overlay	$ 750,000	$ 675,000	$ 75,000
Parallel and exit taxiway overlay	240,000	216,000	24,000
Parallel taxiway lighting	245,000	220,000	25,000
Helipad construction	40,000	36,000	4,000
FBO access taxilane - Rehabilitate and extend	250,000	225,000	25,000
Property acquisition - 160 acres: conservation easement	400,000	360,000	40,000
Mid-Range Projects (5 to 10 Years)			
Main apron rehabilitation	110,000	99,000	11,000
Hangar access taxilanes	110,000	99,000	11,000
Hangar access road extension	30,000	27,000	3,000
Runway 30 holding apron	65,000	58,000	7,000
South/east perimeter fencing	100,000	90,000	10,000
Westside fencing	80,000	72,000	8,000
Core area fencing and gates	65,000	58,000	7,000
Property acquisition - 200 acres: conservation easement	500,000	450,000	50,000
Long-Term Projects (10 to 20 Years)			
New west side taxiway	230,000	207,000	23,000
New tiedown apron	215,000	193,000	18,000
New FBO access taxilane	115,000	103,000	12,000
Property acquisition - 210 acres: fee simple	650,000	585,000	65,000
Totals			
Short Term	$ 1,925,000	$ 1,732,000	$ 193,000
Mid Range	1,060,000	953,000	107,000
Long Term	1,210,000	1,088,000	118,000
MASTER PLAN TOTALS	$ 4,195,000	$ 3,773,000	$ 300,000

Source: Hodges & Shutt

enjoyed will continue beyond the current legislation's expiration in 1992.

Although the AIP is designed specifically for public airport improvement, there are other federal programs which also can be applied to airport needs. The federally-funded Economic Development Administration (EDA) Program and the State and Local Fiscal Assistance Act of 1972, as amended, have also been used on a limited scale to fund airport facilities not otherwise eligible for AIP grants. As it is relatively difficult for public airports such as the Porterville Municipal Airport to qualify for these special federal funding programs, these funding resources have not been considered in the formulation of Master Plan funding alternatives.

State Grants and Loans

The California Aid to Airports Program (CAAP), administered by the State Division of Aeronautics, is similar to the federal AIP grant program inasmuch as the state program provides airport development funds on a matching share basis, which is currently 90% state and 10% local. The state grants are allocated through the California Transportation Commission and are governed by the priorities set forth in the State Transportation Improvement Program (STIP). Typically, the state grant program has concentrated on construction of airfield improvements that benefit general aviation users. Additionally, recent state policy has called for an increased focus on airports in heavily urbanized areas. Due to state funding constraints, funding opportunities within this program are somewhat limited at present.

The State Division of Aeronautics also administers an Annual Grant Program through which all public airports in the state receive $5,000 per year to be used for grant eligible projects. Funds received must be kept in a Special Aviation Account and, with permission from the Division of Aeronautics, can be accumulated for up to five years toward a large capital project. The funds can also be used as part of a local match for a federal grant. An effort is underway in the State Legislature to increase this allocation to $10,000 per year. However, the success of this initiative is uncertain at present.

Additionally, a State Airport Loan Program has been established to allow public airport owners to borrow funds at lower than commercial interest rates for use on specified revenue-generating airport projects and as the local share of a FAA AIP grant. In the past, the most common use of these loans has been for hangar construction. More recently, its primary use has been as the local share of a FAA grant. Current thinking within the industry suggests that the state loan program will be expanded in the near future, both in total size and project eligibility.

Municipal Airport Owner Funding

At large municipal airports, this source of financing typically involves the issuance of general obligation or revenue bonds. However, at smaller municipal airports such as Porterville, the costs and restrictions associated with the issuance of general obligation and revenue

bonds combine to make such bonds impractical for use in funding small airport capital projects.

At airports the size and character of Porterville Municipal Airport, municipal funding principally involves the use of the sponsoring community's general fund resources. The use of this limited community resource for funding of airport operations is generally avoided when possible at most airports. Typically, a community's general fund is fiscally limited and usually committed to higher priority community uses. It may be possible, however, to secure an annual allocation or a loan from the general fund to offset airport operating and maintenance costs, for capital projects, or for grant matching purposes. Such allocations are usually justified in recognition of the airport's public service contribution to the community. The use of general fund monies in support of an airport's operating and capital costs is determined by each community's respective policies, priorities, and fiscal resources.

Private Investment

By continuing to promote the Airport, improving its facilities, maintaining a prudent lease policy, and enforcing reasonable development standards, the City can maintain the attractiveness of the Airport to the private sector. In this manner, the City can shift the burden of certain financing and development costs (e.g., hangars, FBO facilities, access roads, landscaping, etc.) to the tenant while increasing the asset value of the Airport, which will in turn add to the Airport's economic attractiveness and revenue producing capability.

The most common sources of funding for private sector development are commercial lending institutions and insurance companies. In the case of private development on public land, this type of financing may be difficult and expensive to obtain because the borrower can encumber only the improvements as loan collateral, not the underlying publicly owned land. Furthermore, the California Finance Code requires the lease term to exceed the loan payoff period by 10 years. The loan repayment period is therefore compressed, resulting in higher principal payments. These conditions necessitate close attention to leasing policies and tenant contract negotiations. It is essential that agreements be reached with the tenants which provide for adequate airport revenues and facility development while encouraging private investment and satisfying the tenant's borrowing requirements. Specifically, the term must be sufficient to allow reasonable investment amortization over the period of the agreement.

In very rare instances, private gifts and contributions may be used to fund certain airport improvements. Often, the private contribution facilitates the development of public airfield improvements that jointly benefit both the private and public sectors.

Airport Self-Financing

This method refers to financing from the City's airport-generated revenues and retained earnings. Use of this source of financing for funding of complete airport improvements and matching shares for

grants-in-aid is the simplest, and, of course, the most economical method because direct interest charges are eliminated.

To generate the necessary retained earnings, it is essential that airport expenses be minimized and airport revenues be maximized. Expenses can be minimized through careful cost control, energy conservation, joint purchasing and use programs, and, where applicable, contract services. The City of Porterville has already achieved a significant measure of success in minimizing operating expenses at the Airport.

Revenues can be maximized through the application of an appropriate rates and fees schedule, increased airport activity, and additional on-airport development (aviation service facilities and compatible commercial/industrial development).

It should be noted that Porterville Municipal Airport does not currently generate sufficient revenues to enable self-financing of major capital projects.

Conclusions

As noted previously, the proposed Capital Improvement Program will total $4.2 million with approximately $3 million going toward projects in the first ten-year period. Assuming fully-funded AIP and CAAP grants are available, the City's share over the ten-year period will be $200,000 million. It is anticipated that the City's share will be funded through a combination of airport enterprise funds (revenues and retained earnings), loans from California Airport Loan Program, and City general funds.

The City may want to consider utilizing the State Airport Loan Program to provide the local matching funds required for AIP grants. In this way, the fiscal impact of the local matching share requirement can be amortized over a longer period of time.

PRO FORMA FINANCIAL PROJECTION

Projected operating revenues, operating expenses, and net operating income (loss) for the Porterville Municipal Airport are set forth in Table 11. These values are intended as an initial guide for financial planning purposes. The projection covers a period of ten years; however, the focus is on the first five years. It is recommended that the City periodically update and revise this financial projection to correspond with then current information.

The projections set forth in Table 11 are based on the following factors and specific assumptions:

- The projections are based upon 1988 dollar values.
- The Master Plan forecasts of airport activity will be realized.
- There will continue to be effective and prudent management and operation of the Airport throughout the projection period.

Table 11

PRO FORMA FINANCIAL PROJECTION

Porterville Municipal Airport

(1988 Dollar Values in 1000's)

	Budget	Projected									
	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998
REVENUES											
Landing Fees	5.5	5.6	5.8	5.9	6.1	6.2	6.4	6.5	6.7	6.9	7.0
Tiedown Fees	6.1	6.3	6.4	6.6	6.7	6.9	7.1	7.3	7.4	7.6	7.8
Fuel & Oil Sales	118.5	130.4	133.7	137.0	140.4	143.9	147.5	151.2	155.0	158.9	162.9
Restaraunt Rentals	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5
Rent of Land & Buildings	29.9	30.3	30.7	31.0	31.4	31.8	32.2	32.2	33.0	33.4	33.9
Rent of Hangars	3.6	3.6	3.6	7.0	7.0	7.0	7.0	7.0	10.4	10.4	10.4
Other Income	18.6	19.1	19.5	20.0	20.5	21.0	21.6	22.1	22.7	23.2	23.8
TOTAL REVENUES	185.2	198.3	202.7	210.5	215.1	219.8	225.3	229.8	238.7	243.9	249.3
EXPENSES											
Cost of Goods Sold	78.2	86.0	88.2	90.4	92.6	94.9	97.3	99.7	102.2	104.8	107.4
Personnel Costs	38.5	39.0	39.5	40.0	40.5	41.0	55.7	56.4	57.1	57.8	58.5
Equipment Maintenance	2.6	2.6	2.7	2.7	2.7	2.8	2.8	2.8	2.9	2.9	2.9
Buildings/Ground Maintenance	10.8	10.9	11.1	11.2	11.4	11.5	11.6	11.8	11.9	12.1	12.2
Utilities	10.0	10.1	10.3	10.4	10.5	10.6	10.8	10.9	11.0	11.2	11.3
Insurance	8.0	8.2	8.4	8.6	8.8	9.1	9.3	9.5	9.7	10.0	10.2
Supplies & Other Purchases	7.5	7.6	7.7	7.8	7.9	8.0	8.1	8.2	8.3	8.4	8.5
TOTAL EXPENSES	155.6	164.4	167.9	171.1	174.4	177.9	195.6	199.3	203.1	207.2	211.0
NET INCOME (LOSS)	29.6	33.9	34.8	39.4	40.7	41.9	29.7	30.5	35.6	36.7	38.3

Notes:

1. The projections set forth herein are based upon accounting information supplied by the City of Porterville and reflect the operational factors and planning assumptions identified in the accompanying text.

2. The 1988 ACTUAL revenue and expense figures represent Airport Operating Fund - Income and Expense Statement values.

3. Totals may vary in some cases due to rounding.

- Airport management will continue to review and adjust all rates and charges on an annual basis consistent with demand and airport role. As a minimum, the rates and charges should track the Consumer Price Index to maintain constant value.

- No major capital expenditures other than those identified in this report will be required during the forecast period.

- Eligible capital improvements will be financed to the maximum extent possible with Federal Aviation Administration-Airport Improvement Program (AIP) and California Aid to Airports Program (CAAP) funds, with the City's share coming from the airport enterprise account, California Airport Loan Program, and City's general funds as required.

- Airport insurance rates will escalate throughout the projection period, reflecting both increased facilities and anticipated trends in the insurance industry. In an effort to obtain the lowest insurance costs, the City may want to consider municipal airport insurance coverage programs offered by industry groups such as the American Association of Airport Executives.

- It has been assumed that the California State Annual Grant program allocation will be increased from $5,000 annually to $10,000 annually in 1994.

FINANCIAL SUMMARY

The projections set forth in Table 11 suggest that the Porterville Municipal Airport is capable of generating a modest net operating income throughout the ten-year financial planning period.

The importance of this net income to the future operation and development of the Airport cannot be overemphasized. It is suggested that the bulk of the net income be applied towards capital improvement projects that directly benefit the Airport. Such projects include the runway/taxiway overlay, helipad development, security fencing, and land acquisition. Through the maximum application of FAA AIP funds and State grant/loan programs, the City can significantly multiply the effectiveness of its airport-generated fiscal contribution to airport capital improvement projects.

Appendices

Attachment

A

EXISTING FACILITIES

Item	Description	Condition/ Comments
RUNWAY/TAXIWAY SYSTEM		
Runway 12-30		
Pavement	6,000 x 146'; Asphalt Effective Gradient: 0.020% Strength: 30,000# (single wheel) 70,000# (dual-wheel) 110,000# (dual-tandem)	1/
Markings	Nonprecision	
Lighting	Medium-intensity edge lights Runway end identifier lights (T/W 30)	
Approach Aids	Visual approach slope indicators; 4-box type; glide angle 3.0°; Runway 12 pilot controlled	
Taxiways		
Parallel	Entire length of runway, northeast side; 50' wide, Asphalt	See Appendix E
Exit	Runway exit taxiways (4), 50' wide, Asphalt	
Signs	Runway exit taxiway directional arrows; transient parking directional signs	

1/ A separate evaluation of airfield pavement will be conducted; the results will be presented in the next discussion packet.

Item	Description	Condition/ Comments
NAVIGATION AND COMMUNICATION		
VORTAC	Porterville VORTAC; located 7 miles SSE	
Airport Beacon	Standard rotating green/white; located east of FBO area	
Wind Indicators	Lighted wind-tee and wind cone; located midfield, west of runway	
Unicom	Common traffic advisory frequency 122.8 MHz	
BUILDING AREA		
City-Operated Aircraft Parking		
Tie-down Apron (adjacent to terminal)	1.7 acres - asphalt/concrete; 12 single and 3 twin spaces	Good
Tie-down apron (adjacent to Ray's Aircraft)	1.1 acres - asphalt; 10 single spaces	Good
Tie-down apron (Adjacent to Del-Air)	2.8 acres - asphalt; 27 single spaces	Good
T-Hangars	5 single; wood with metal siding	Fair
City Facilities		
Restaraunt/Terminal	Masonry and woodframe	Good
Fuel Storage	2 - 10,000-gallon tanks: 80 octane aviation gas 2 - 10,000-gallon tanks: 100LL octane aviation gas	
Aircraft Rescue/ Fire Fighting Building	Steel, prefabricated building	Very good

Item	Description	Condition/ Comments
Water Storage Tank	Steel; 300,00 gallons capacity	Good
Fencing/Gates	Chain link in core area; barbed wire around perimeter	Good/Poor
FIXED BASE OPERATIONS		
Arrow Falcon Exporters	Total Leasehold: 16,000 sq. ft. Office: 1,200 sq. ft. Hangar: 6,000 sq. ft. Auto Parking: 6 spaces	Good
Del-Aire:	Total Leasehold: 22,500 sq. ft. Office: 1,200 sq. ft. Hangar: 9,200 sq. ft. Auto Parking: 5 spaces	Good
Porterville Aviation	Total Leasehold: 49,900 sq. ft. Office: 800 sq. ft. Hangar: 6,000 sq. ft. Apron: 8 tie-downs Auto Parking: no designated spaces	Good
Ray's Aircraft	Total Leasehold: 29,000 sq. ft. Office: 1,280 sq. ft. Hangar: 4,800 sq. ft. Machine shop: 1,280 sq. ft. Apron: 8 tie-downs Auto Parking: 10 spaces	Good
Troupe Enterprises	Total Leasehold: Part of Porterville Aviation Hangar: 6,400 sq. ft.	Good
PRIVATE HANGAR RENTALS		
Billingsly	2 units, wood w/metal siding	Fair
Coulter	10 units, individual portable; 4 shade hangars	Good

Item	Description	Condition/ Comments
Craeger	2- 45' x 50' steel hangars, 3 portables, and 1 tie-down	Good
M & W Flying Service	9 shade hangar spaces	Good
OTHER AVIATION USES		
U.S. Forest Service - Air Attack Base	5.2-acre leashold; steel building used as office/shop; fire retardant storage tanks and pumps; control tower with enclosed cab	Good
Federal Aviation Administration	400 sq. ft. Remote transmitter/ reciever building	Good
Porterville Area Pilots Association	1,200 sq. ft. fenced storage area	Good
INDIVIDUAL HANGARS		
Gridley	3 - 66' x 90', steel	Excellent

AIRPORT DESIGN STANDARDS

GENERAL CRITERIA

The Federal Aviation Administration has established standards pertaining to runway length, pavement strength, runway and taxiway clearances, etc. These standards vary depending upon the airport's specific operating conditions (e.g. elevation, average maximum temperature, type of approach) and the characteristics of the "critical" aircraft which regularly use the facility or are expected to do so. At airports having multiple runways, each runway may have a different set of standards if each has a different type of approach or critical aircraft.

Aircraft are differentiated primarily according to weight, approach speed, and wingspan.

- **Weight** -- Aircraft weight (specifically maximum certificated takeoff weight) is a determining factor in pavement strength and other basic airfield design components.

- **Approach Speed** -- Aircraft approach speed influences runway length, runway setback distances, and various safety requirements.

- **Wingspan** -- Aircraft wingspan is a principal determinant of required runway, taxiway, and taxilane clearance standards.

These characteristics of the critical user aircraft determine the type of airport (or runway) as Basic Utility, General Utility, or Transport as summarized in Table A-1. Table A-2 lists the characteristics of specific aircraft and notes the categories in which each aircraft belong.

Table B - 1

GENERAL AVIATION AIRPORT CLASSIFICATION CHARACTERISTICS

Airport Classification	Aircraft Accommodated				Precision Approach Commonly Available?
	Weight	Approach Speed	Wingspan	Examples	
Basic Utility Stage I	75% of fleet up to 12,500 lbs. (including some twins)	up to 121 knots	up to 49 ft.	Cessna 172 Skyhawk Piper PA-28 Archer	No
Basic Utility Stage II	Most airplanes up to 12,500 lbs. (including many twins plus some air taxi types)	up to 121 knots	up to 49 ft.	Beech Bonanza A36 Mitsubushi Marquis	No
General Utility Stage I	All airplanes up to 12,500 lbs.	up to 121 knots	up to 49 ft.	Cessna 404 Cessna Citation I Piper PA-31 Navajo Swearingen Merlin III	No
General Utility Stage II	All airplanes up to 12,500 lbs plus some heavier	up to 121 knots	up to 79 ft.*	Beech Super King Air 200 Cessna Citation II Dassault Falcon 50 DeHavilland DHC-6 Otter DeHavilland DHC-7 Embraer 110 Bandeirante	Yes
Transport	All weights	up to 166 knots	up to 262 ft.	Canadair Challenger CL-600 Fairchild F-27 Gulfstream III Learjet 35 Rockwell Sabre 75A	Yes

* Up to 118 feet if approach speed is less than 91 knots.

Table B - 2

AIRCRAFT CHARACTERISTICS

Aircraft	Engines	Maximum Seats	Maximum Takeoff Weight (pounds)	Wingspan (feet)	Approach Speed (knots)	Weight Group	Design Group	Approach Category
Piston Propellor								
Beech Bonanza A36	1	5	3,600	33.5	72	small	I	A
Cessna 172 Skyhawk	1	4	2,400	36.0	70	small	I	A
Cessna 404 Titan	2	10	8,450	46.3	92	small	I	B
Mitsubushi Marquise	2	9	11,575	39.1	88	small	I	A
Piper PA-28 Archer	1	4	2,550	35.0	69	small	I	A
Piper PA-32 Navajo	2	6	6,500	40.7	100	small	I	B
Turboprop								
Beech Super King Air 200	2	15	12,500	54.5	103	small	II	B
DeHavilland DHC-6 Otter	2	22	12,500	65.0	75	small	II	A
DeHavilland DHC-7	4	53	44,000	93.0	86	large	III	A
Embraer 110 Bandeirante	2	19	12,500	50.3	92	small	II	B
Fairchild F-27	2	48	42,000	95.2	109	large	III	B
Gulfstream I	2	40	35,100	78.5	113	large	II	B
Short Brothers SD3-60	2	36	26,453	74.8	102	large	II	B
Swearingen Merlin III	2	10	12,500	46.3	105	small	I	B
Jet								
British Aerospace BAe-146-200	4	109	89,500	86.4	100	large	III	B
Canadair Challenger CL-600	2	21	32,500	61.8	125	large	II	C
Cessna Citation I	2	9	11,850	47.1	108	small	I	B
Cessna Citation II	2	11	13,300	51.6	108	large	II	B
Cessna Citation III	2	15	17,000	53.5	114	large	II	B
Dassault Falcon 50	3	16	38,480	61.9	113	large	II	B
Gulfstream III	2	22	68,700	77.8	136	large	II	C
Learjet 25	2	10	15,000	35.6	137	large	I	C
Learjet 35	2	10	18,000	39.6	143	large	I	D
Rockwell Sabre 40	2	10	18,650	44.4	120	large	I	B
Rockwell Sabre 60	2	10	20,172	44.6	120	large	I	B
Rockwell Sabre 75A	2	10	23,000	44.7	137	large	I	C

Definitions

Weight Groups

		Maximum Certificated Takeoff Weight
Small	–	12,500 pounds or less
Large	–	over 12,500 pounds

Design Groups

		Wingspan
I	–	Less than 49 feet
II	–	49 to* 79 feet
III	–	79 to* 118 feet
IV	–	118 to* 171 feet
V	–	171 to* 197 feet
VI	–	197 to* 262 feet

* but not including

Approach Category

		Approach Speed
A	–	Less than 91 knots
B	–	91 to* 121 knots
C	–	121 to* 141 knots
D	–	141 to* 166 knots
E	–	166 knots or more

* but not including

** Defined as 1.3 times stall speed (V_{so}) at maximum certificated landing weight

APPLICATION TO PORTERVILLE MUNICIPAL AIRPORT

Among the aircraft which regularly use the Airport, the fire suppression tankers at the Porterville Fire Attack Base are the most demanding aircraft in all three categories. The DC-6 (and variants: DC-4 and DC-7) are the most common types of air tankers currently used at the base. These aircraft have begun to be replaced by civilian conversions of military surplus C-130's (Lockheed Hercules). When major fires occur, C-130's from the Air National Guard with slip-in retardant tanks are sometimes used. The characteristics of the aircraft are compared below. Although the military version of the C-130 would only infrequently use the Airport, it is worth noting its characteristics.

Aircraft	Gross Takeoff Weight (pounds)	Approach Speed	Wingspan (feet)
DC-6	104,000	108	118
DC-7	143,000	110	128
C-130 (civilian)	125,000	137	133
C-130 (military)	145,000	137	133

The C-130 is considered to be the critical aircraft for Runway 12-30, all taxiways and the taxilanes providing access to the fire attack base. Porterville Municipal Airport, therefore, meets the definition of a Transport category airport. The dimensional standards which apply to the Airport are presented in Table A-3. Also, presented for purposes of comparison are the standards for other, lower categories.

The aircraft using Porterville Municipal Airport are predominantly are small, utility category airplanes (i.e., they weigh no more than 12,500 pounds and have approach speeds less than 121 knots). Most of these are single-engine and light, twin-engine propeller-driven airplanes -- typically weighing less than 8,000 pounds. The Airport does receive use by turboprop and occasionally light turbojet aircraft (e.g., Cessna Citation I). In those areas of the airfield which are not intended to be used by fire attack aircraft, it is

Table B - 3
AIRFIELD DESIGN STANDARDS

	Existing Standards				Former Standards	Existing Dimensions
	Basic Utility Stage II[a,h]	General Utility Stage I[a,h]	General Utility Stage II Precision[a,j]	Transport[b]	Basic Transport[c]	Runway 12-30
Pavement Strength	12,500 lbs.	12,500 lbs.	12,500+ lbs.	12,500+ lbs.[d]	60,000 lbs.	30,000+ lbs.
Runway						
Length[e]	3,300 ft.	3,900 ft.	4,600 ft.	4,900 ft. to 10,000 ft.[f]	[g]	6,000 ft.
Width	60 ft.	60 ft.	100 ft.	100 ft.	100 ft.	146 ft.
Taxiway						
Width	25 ft.	25 ft.	35 ft.	35 ft.[i]/50 ft.[j]	40 ft.	50 ft.
Runway Safety Area						
Width	120 ft.	120 ft.	300 ft.	500 ft.	300 ft.	500 ft.
Length (beyond runway end)	240 ft.	240 ft.	600 ft.	1,000 ft.	600 ft.	Rwy 12 - 400 ft. Rwy 30 - 500 ft.
Runway Obstacle Free Zone						
Width	250 ft.	250 ft.	300 ft.	–	–	400 ft.
Runway Centerline to:						
Runway Centerline[k]	700 ft.	700 ft.	700 ft.	700 ft.	700 ft.	–
Taxiway Centerline	150 ft.	225 ft.	300 ft.	400 ft.[l]	300 ft.	500 ft.
Aircraft Parking Area	125 ft.	200 ft.	300 ft.+4:1	500 ft.[m]	375 ft.	560 ft.
Building Restriction or Property Line						
Non-Taxiway Side	125 ft.	200 ft.	300 ft.+4:1	750 ft.[n]	400 ft.	750+ ft.
Taxiway Side	194 ft.[o]	269 ft.[o]	300 ft.+4:1 367 ft. minimum[o]	750 ft.[n]	400 ft.	750 ft.
Taxiway Centerline to:						
Fixed or Movable Obstacle	44 ft.	44 ft.	67 ft.	64 ft.[i]/94 ft.[j]	75 ft.	60 ft.
Taxiway Centerline	69 ft.	69 ft.	103 ft.	103 ft.[i]/153 ft.[j]	150 ft.	–

[a] Source: FAA Advisory Circular 150/5300-4B, Change 8, "Utility Airports – Air Access to National Transportation" (1985).

[b] Source: FAA Advisory Circular 150/5300-12, "Airport Design Standards – Transport Airports" (1983).

[c] Source: FAA Advisory Circular 150/5300-6A, "Airport Design Standards – General Aviation Airports – Basic and General Transport" (1981).

[d] As needed for critical aircraft.

[e] Standards relative to Porterville Municipal Airport's 99° F. mean maximum, hottest month temperature and 444 feet MSL elevation.

[f] Varies depending upon proportion of fleet and percentage of useful load accommodated.

[g] Same as current Transport standards.

[h] For aircraft with wingspans up to 49 feet.

[i] For aircraft with wingspans up to 79 feet.

[j] For aircraft with wingspans up to 118 feet.

[k] For simultaneous VFR operations.

[l] May be reduced provided that no part of an aircraft on taxiway centerline comes over the runway safety area or penetratres the runway obstacle free zone.

[m] Separation may be reduced to 400 feet if the runway is used only for aircraft with wingspans up to 79 feet, has visibility minimums of 1.0 mile or greater, and has no precision instrument operations.

[n] Separation may be reduced to 500 feet if the runway is used only for aircraft with wingspans up to 79 feet, has visibility minimums of 1.0 mile or greater, and has no precision instrument operations.

[o] Assuming taxiway to fixed or movable obstacle distance below.

appropriate to base taxilane clearances (and other dimensional standards) on a "critical" aircraft in the utility category. The intent is to preserve access by the entire utility fleet without unnecessarily restricting development. Therefore, on the taxilanes providing access to the fixed base operations (businesses providing aviation services) and hangars, the Beech Super King Air will be used as the critical aircraft.

PORTERVILLE MUNICIPAL AIRPORT
NOISE MODEL INPUT DATA

AIRCRAFT MIX

Aircraft Type	Total Operations Annual	Average Day	Percentage
(1988 Count)			
Single-Engine	27,810	76.2	92.7
Light Twin-Engine	1,440	4.0	4.8
DC-6	510	1.4	1.7
S-2	180	0.5	0.6
Light Jet	60	0.2	0.2
Total	30,000	82.3	
(2008 Projection)			
Single-Engine	48,400	132.6	88
Light Twin-Engine	4,895	13.4	8.9
C-130	550	1.5	1.0
S-2 Turbo	165	0.5	0.3
Light Jet	770	2.1	1.4
Medium Jet	220	0.6	0.4
Total	55,000	150.7	

TIME OF DAY

	Percent of All Operations: Day 7:00 a.m. 10:00 p.m.	Night 10:00 p.m. 7:00 a.m.
(1988 Count)		
Single-Engine	85	15
Light Twin-Engine	80	20
DC-6	100	0
S-2	100	0
Light Jet	95	5
(2008 Count)		
Single-Engine	85	15
Light Twin-Engine	80	20
C-130	100	0
S-2 Turbo	100	0
Light Jet	95	5
Medium Jet	95	5

RUNWAY UTILIZATION

	Percent of Takeoffs: Runway 12	Runway 30	Percent of Landings: Runway 12	Runway 30
(1988 Projection)				
Single-Engine				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
Light Twin-Engine				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
DC-6				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
S-2				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0

Continued on next page

PORTERVILLE MUNICIPAL AIRPORT
NOISE MODEL INPUT DATA
(Continued)

RUNWAY UTILIZATION

	Percent of Takeoffs		Percent of Landings	
	Runway 12	Runway 30	Runway 12	Runway 30
(2008 Projection)				
Single-Engine				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
Light Twin-Engine				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
DC-6				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0
S-2				
Day	10.0	90.0	10.0	90.0
Night	10.0	90.0	10.0	90.0

FLIGHT TRACKS

(Same for all years and times of day)

Takeoff 12	N1D	N2D	S1D	S2D	N1A	N2A	S1A	S2A
Single-Engine	---	---	40%	60%	---	---	---	---
Light Twin-Engine	---	---	40%	60%	---	---	---	---
C-130	---	---	100%	---	---	---	---	---
S-2	---	---	100%	---	---	---	---	---
Light Jet	---	---	100%	---	---	---	---	---
S-2 Turbo	---	---	100%	---	---	---	---	---
Medium Jet	---	---	100%	---	---	---	---	---
Takeoff 30								
Single-Engine	60%	40%	---	---	---	---	---	---
Light Twin-Engine	60%	40%	---	---	---	---	---	---
C-130	100%	---	---	---	---	---	---	---
S-2	100%	---	---	---	---	---	---	---
Light Jet	100%	---	---	---	---	---	---	---
S-2 Turbo	100%	---	---	---	---	---	---	---
Medium Jet	100%	---	---	---	---	---	---	---
Landing 12								
Single-Engine	---	---	---	---	---	---	---	100%
Light Twin-Engine	---	---	---	---	---	---	---	100%
C-130	---	---	---	---	---	---	100%	---
S-2	---	---	---	---	---	---	100%	---
Light Jet	---	---	---	---	---	---	100%	---
S-2 Turbo	---	---	---	---	---	---	100%	---
Medium Jet	---	---	---	---	---	---	100%	---
Landing 30								
Single-Engine	---	---	---	---	---	100%	---	---
Light Twin-Engine	---	---	---	---	---	100%	---	---
C-130	---	---	---	---	100%	---	---	---
Light Jet	---	---	---	---	100%	---	---	---
S-2 Turbo	---	---	---	---	100%	---	---	---
Medium Jet	---	---	---	---	100%	---	---	---

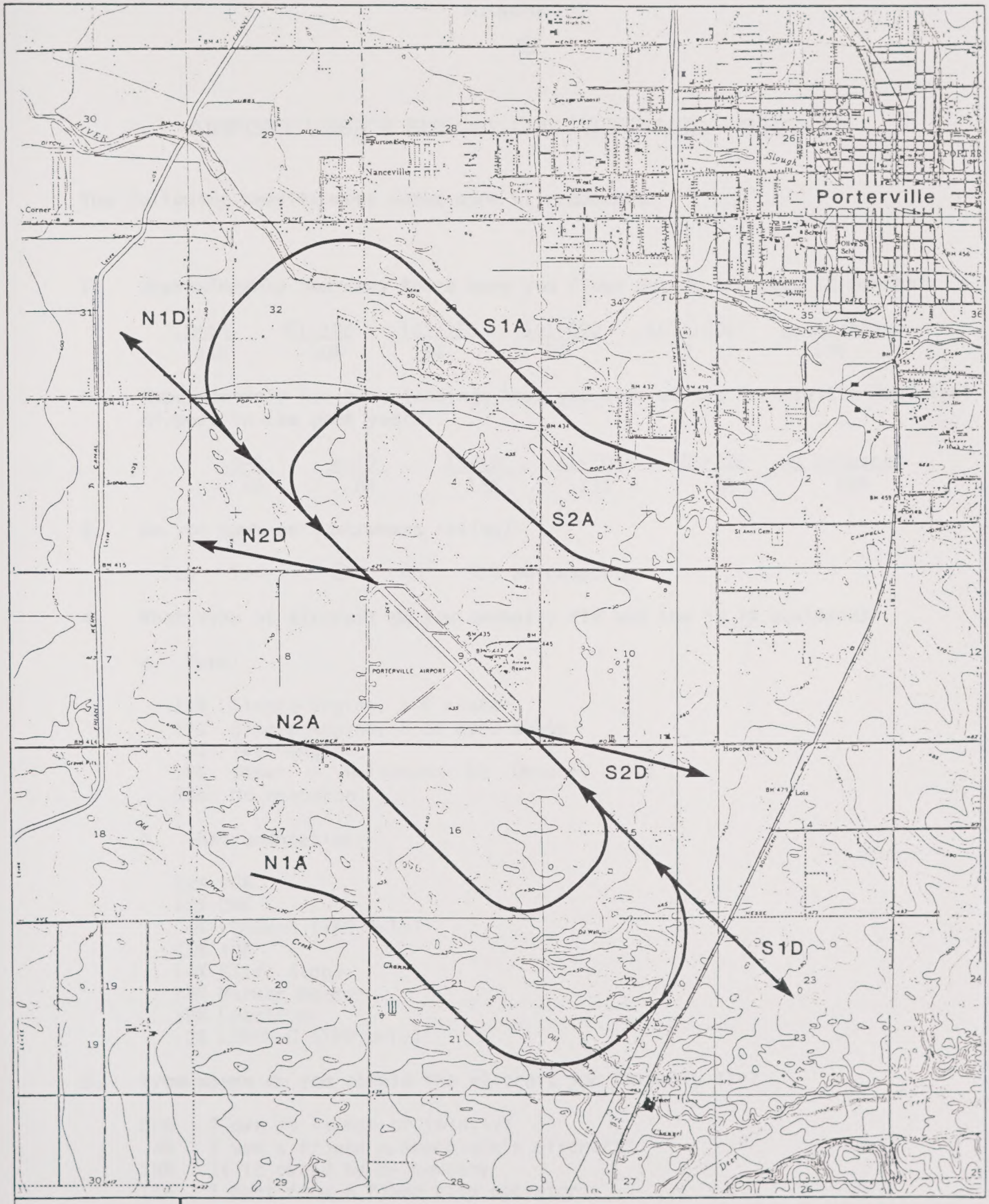

FIGURE
C - 1

TYPICAL AIRCRAFT FLIGHT TRACKS

HODGES & SHUTT

Attachment

D

AIRPORT USER'S SURVEY QUESTIONNAIRE - RESULTS

The following results were based upon 51 responses.

1. **Approximately how many hours have you flown during the past 12 months?**

0-50	51-100	101-350	301-600	601-1000	No Response
22%	10%	13%	2%	3%	50%

2. **Approximately how many landings have you made at the Porterville Municipal Airport in the past year?**

0-5	6-12	13-40	41-100	101-225	No Response
4%	8%	15%	17%	8%	48%

3. **Do you have an instrument rating?**

26% Yes 23% No 51% No response

4. **What type of aircraft do you normally fly and how is it equipped?**

a. Type:

13% Single-engine, 1-3 seats
40% Single-engine, 4 or more seats
9% Twin-engine
10% Other - Helicopter 3% Observe - 1%
28% No response

b. Instrumentation:

22% VOR
13% DME
4% LORAN-C (VFR only)
13% ADF
14% Glide Slope
14% Marker Beacon
13% Localizer
2% LORAN-C (IFR only)

5. **From where do you obtain the aircraft you normally fly?**

60% I own it (alone or jointly)
4% I use a friend's/associate's aircraft
18% It is owned by my company
11% I rent from a fixed base operator
4% I use a flying club aircraft

6. **At which airport is the above aircraft based?**

65% Porterville Municipal Airport
35% Other:
- 6% - Eckert Field/Strathmore
- 6% - Springville/Sequoia Ranch
- 4% - Visalia
- 4% - Tulare
- 2% - Delano
- 2% - Private
- 2% - Chino
- 2% - Corvallis, Oregon
- 2% - Redlands
- 2% - Salinas
- 2% - Montgomery Airport, San Diego
- 2% - Fresno

7. **In what community do you usually begin/end your local ground trip to/from the Porterville Municipal Airport and how long does this trip take?**

Community/Zip Code		Driving Time
9%	Terra Bella	10-15 minutes
2%	Tulare	20-45 minutes
47%	Porterville	0-20 minutes
2%	Springville	20-25 minutes
1%	Tipton	30-60 mintues
1%	Woodville	
3%	Visalia	40-45 minutes
1%	Upland	3 hours

8. **During the last year, have you cancelled a planned flight to/from Porterville Municipal Airport (or diverted to another airport) due to poor visibility (e.g. fog, etc.) at that airport? If so, how many times?**

52% No, I have not done either
13% Yes, one or two times
21% Yes, three to five times
13% Yes, more than five times

9. **During the last year, have you diverted to another airport or landed on the closed runway because of severe cross winds? If so, how many times?**

80% No, I have not done either
14% Yes, one or two times
4% Yes, three to five times
2% Yes, more than five times

10. How do the following factors affect your choice of Porterville Municipal Airport as a base or destination airport? (Results in percentages)

	Very Important	Somewhat Important	Not Important	No Response
Close to home	70	18	11	1
Close to business	62	25	11	2
Company aircraft based there	36	16	48	0
Rental aircraft based there	33	23	42	2
Personal aircraft based there	65	11	22	2
Flying club aircraft based there	22	5	72	1
Tiedown availability	66	16	16	2
Hangar availability	60	23	16	1
Cost considerations	62	21	15	2
Aircraft security	85	15	3	0
Good FBO services	74	20	4	2
Good pilots' facilities	61	26	11	2
Friendly atmosphere	73	22	4	1
Good runway	85	12	2	1
Runway lighting	81	15	2	0
Instrument approach	19	45	35	1
Favorable weather	63	22	13	2
Other	0	0	0	0

11. What are the purposes of your flights into the Porterville Municipal Airport? (Results in percentages)

	0	0-25%	26-50%	51-75%	76-100%
Company Business	53	4	10	6	26
Personal Business	69	18	10	0	0
Pleasure/Recreation	23	28	12	8	28
Flight Training	69	8	12	0	10
Other: Search and Rescue Helicopter Test Flights	91	8	0	0	0

No Response 3%

12. For flying purposes, how do you rate each of the following facilities at Porterville Municipal Airport? (Results in percentages)

	Adequate As Is or Not Needed	Should Improved or Provided	No Response
RUNWAY/TAXIWAY SYSTEM			
Runway exit locations	71	7	22
Runway/taxiway pavement conditions	71	7	22
Crosswind runway	48	12	40
Obstruction lighting	57	12	31
Runway lighting	69	5	26
Taxiway lighting	64	5	31
Runway/taxiway signs & markings	52	17	31
BASED AIRCRAFT FACILITIES			
Number of hangars	26	45	29
Size/condition of hangars	49	14	37
Number of tiedowns	52	7	41
Apron pavement condition	55	2	33
Apron lighting	45	17	38
TRANSIENT AIRCRAFT FACILITIES			
Number of transient tiedowns	50	21	29
Transient tiedown location signs/ markings	36	31	33
Apron lighting	40	17	43
AUTOMOBILE FACILITIES			
Number of spaces	62	10	28
Parking area condition	67	12	21
Signs/markings	49	21	30
OTHER FACILITIES/SERVICES			
Fuel service	64	21	15
Unicom	52	29	19
Air traffic control tower	36	40	24
Weather reporting	33	40	27
Aircraft maintenance/repair	45	21	34
Other FBO services	36	29	35
Pilots' facilities (lounge, phones, rest rooms)	59	14	27
Coffee shop/restaurant	29	52	19
Automobile rental	48	10	42
Airport security	36	28	36
Other	0	2	98

Specify:
1% Need wider run-up apron
1% On field toilet facilities

13. **What specific items do you believe should be addressed in the current Airport Master Plan Study?**

"Include a recommendation for AG aircraft operations from the east-west runway at south end of facility".

"Keep nonaviation business out of the core area".

"Seek FAA grant for NDB and Microwave Landing System".

"Install full ILS landing system".

"Airport Security".

"250 x 070 runway, lights, taxiway, and approach".

"Taxiway lights - ILS system - runway surface - security fence".

"Automatic combo or card gates; pilot-actuated lighting (particularly after 12 p.m."

"Precision approach, security."

"Taxiway lighting, paint airport name on runway".

"Should have at least an IFR/ILS and lights, open one other runway".

"Precision approach".

"Add one other low cost car rental".

"Facilities, security, signs, direct line to FAA".

"Avionics repair - GA pilot lounge/planning".

"Access road to state forest fire facilities."

"Correct maintenance on runways".

"Improve gasoline and personal aircraft maintenance facilities i.e., wash rack, air facilities."

"No residential housing to be built nearby".

"Increased hangar space - open crosswind runway".

"Must show area for agricultural flying."

"Hangar/hangar site availability pilot facilities."

"Better apron lighting".

13. **(Continued) -**

"Crosswind runway".

"Inexpensive hangars or open hangar space".

"Reopening of runway, proper control of available funds - use of available grants, better relations with prospective business."

"VASI lights for all runway aprons".

"Crosswind runway - reopen security gates".

"Reopen 25-7 runways".

"Reopen 25-7, taxiway lighting, subdivision encroachment".

"Runway surface, improvement, taxiway lights, security fence, ILS system".

"Crosswind runway should be upgraded and put into use."

"Hangar spaces - various surface conditions. PAD eyes rather than cable tie-downs."

"Take the dips out of the runway".

14. **Do you have any additional comments regarding long-range planning and development of the Porterville Municipal Airport?**

"Open the closed runway".

"A/C parking spaces should have pad eyes - better markings and more choices available".

"Our airport is an asset! Don't sell off land prematurely or allow housing development to impact future use of airport".

"Purchase more property under the end zones of the main runway and noise zone the contiguous area. Plan to extend main runway in the future."

"Do not allow fencing shortly west of runway, prevent subdivision development west, north, south -- add toilet facilities".

"Need taxi lighting".

"Encourage more FBO's, private and business pilots".

"Keep the recreational pilot in mind:.

"Be consistent".

14. (Continued) -

"Agricultural aviation is extremely important in an agricultural community. It needs long range consideration".

"To crowd any buildings around airport".

"Control ultra lights - no pilots license, no use of airport -- they cause hazardous conditions."

"Improve pilots lounge".

"Planning/development should be in pencil".

"Feel there should be a nonpolitical Airport Board made up of flyers and nonflyers!".

"Open closed crosswind runway, UNICOM, improve facilities, lighting, on ramps/aprons."

"Need precision approach ILS".

"Runway 30 is buckling up again 1/3 of the way down."

"Keep clear zones away from airport".

"More hangar spaces for individuals - better security gates."

"Longer clear and noise zones for main runway. Plan to extend main runway".

"I do not like the strobe - should be better type."

"Bring in aircraft related business and not general business".

"Strong County zoning to avoid building where aircraft noise would be a problem".

"Support it, its good for business, keep it in good physical shape".

"I am pleased that it is being addressed by professionals and the City government".

"Keep non-aviation business out of core area".

"Agriculture is an important part of the local business community. Serving the needs of agriculture should be considered a priority."

PORTERVILLE AIRPORT MASTER PLAN
Airfield Pavement Evaluation

As part of the present study, an evaluation of existing airfield pavement was performed. The results of this evaluation are summarized below, and presented in detail in the matrix which follows.

All of the active airfield pavements are asphalt, except one Portland Cement concrete apron. The asphalt concrete runway and taxiway pavements currently in use are generally in fair to good condition. The distress observed was primarily age or non-load related, and included surface weathering and ravelling, block cracking, and longitudinal cracking along construction joints, The pavements on the abandoned crosswind runway and the midfield taxiway are in very poor condition, with severe surface weathering and cracking throughout. The asphalt concrete aprons are generally in fair to good condition; however, in addition to age-related distresses, more frequent load-related distress or alligator cracking was observed in these areas.

The concrete apron is in good condition, with joint seal damage as the only distress observed.

All of the pavements need repair to maintain, extend or restore their service life. Recommendations for individual pavement sections are contained in the matrix which follows. The repairs considered appropriate at this time range from isolated patching, crack sealing, and fog sealing, to overlays with fabric membranes.

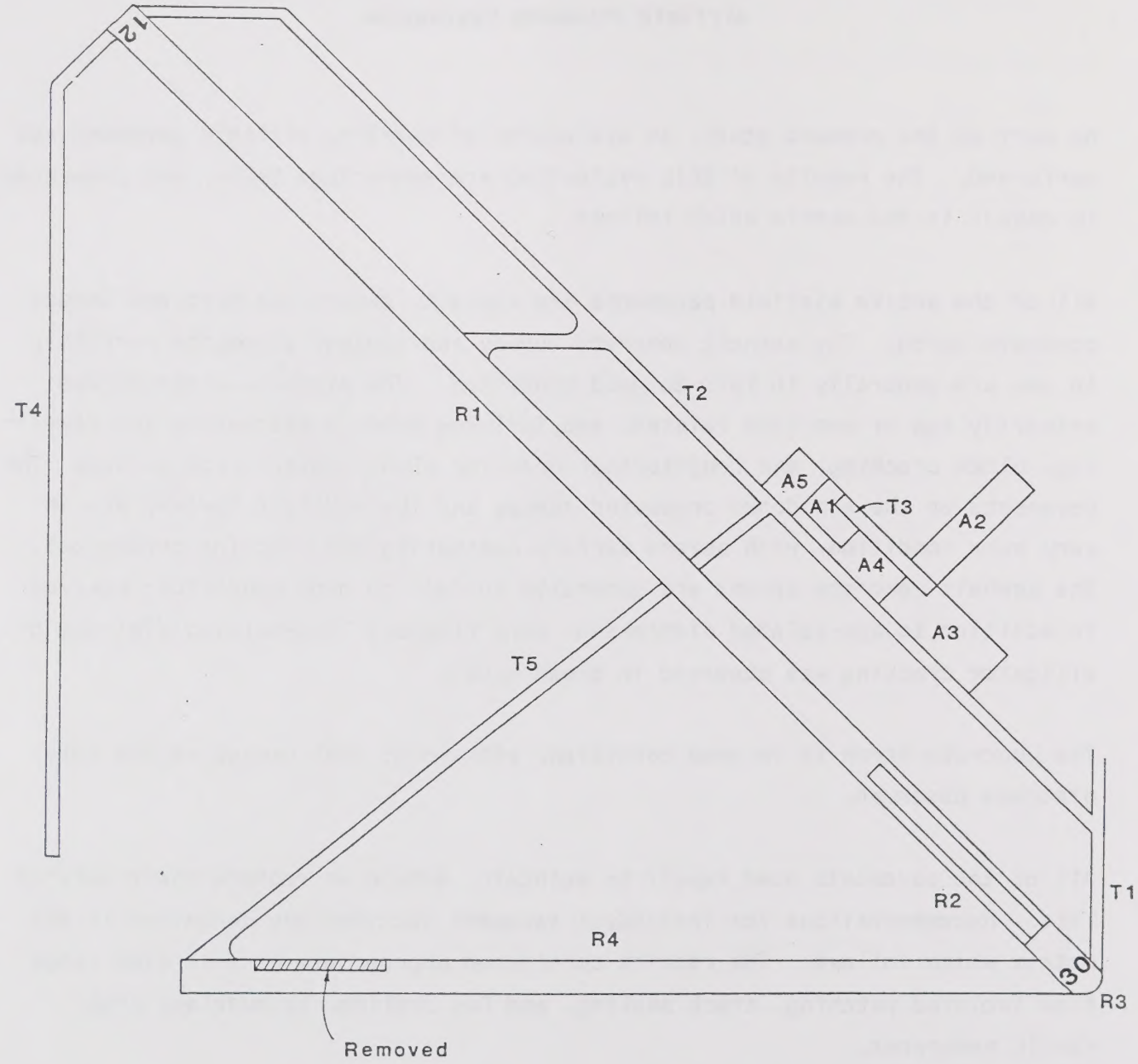

FIGURE
E - 1

KEY TO PAVEMENT AREAS

HODGES & SHUTT

PORTERVILLE MUNICIPAL AIRPORT

AIRFIELD PAVEMENT DESIGN

AIR PORT	Segment	Area (1,000) (Sq.Ft.)	Pave Type	Pavement Rating	Recommended Treatment: tech nique	unit cost	total cost	Weighted Rating	Origin Constr Date	Last Overlay date	thick	Last Maintnce date	tech	Section: Surf	Base	SBase	Condition: ROUGH	ALICRK DISINIT	RUTING FALTING	RAVLNG LACRK	BLCRK NLACRK	SPALING	Drain	width C	length ment	fac code
														12	10	PCC AC	2	2	2	3	1	2				
																	2	3	2	2	1					
A/P	ID#	area	Type	Prate	Reqd	Unit	Cost	Wrate	OrgDate	OvDate	OvThk	MnDate	Mntc	Surf	Base	SBase	Falt1	Falt2	Falt3	Falt4	Falt5	Falt6	Drain	Co	widths	length
	PORTERVILLE																									
PTV	R-1	697.5	AC	1.50	6	0.51	355.7	150		1975	3			4	6	5	1	1	2	2	2		1		150	4,650
PTV	R-2	150.0	AC	1.40	6	0.51	76.5	140	1975					4	8	9	1	1	2	2	1		0		150	1,000
PTV	R-3	52.5	AC	1.10	6	0.51	26.8	110		1975	3			3	9	17	1	1	2	1	0		0		150	350
PTV	R-4	570.0	AC	3.40	10	0.65	369.9	136									4	2	4	4	4		2		150	3,000
PTV	T-1	32.5	AC	1.00	1	0.01	0.4	30	1975					4	8	9	1	1	1	1	1		0		50	650
PTV	T-2	305.0	AC	1.00	1	0.01	3.4	30		1975	3			4	6	5	1	1	1	1	1		0		50	6,100
PTV	T-3	27.5	AC	1.92	6	0.51	14.0	38									1	3	1	4	1		1		50	550
PTV	T-4		AC													ABANDONED										
PTV	T-5	147.5	AC	2.50	10	0.65	95.7	50									2	2	2	4	3		2		50	2,950
PTV	A-1	31.3	PCC	0.42	13	0.18	5.6	4						6			1	0	1	0	1	0	0		125	250
PTV	A-2	90.0	AC	2.80	6	0.51	45.9	28									2	3	2	4	3		2		150	600
PTV	A-3	68.8	AC	2.20	1	0.01	0.8	22									1	3	2	3	1		1		225	550
PTV	A-4	62.5	AC	0.50	1	0.01	0.7	5	1975					4	6	5	1	0	0	1	1		0		125	500
PTV	A-5	45.0	AC	0.42	1	0.01	0.5	4	1980					4	6	5	1	0	0	1	0		0		200	225
		2,280					996																			

1	Primary Runway (IFR or > 4000)	100
2	Primary Runway - Other	75
3	Secondary Runway	40
4	Primary Taxiway	30
5	Feeder Taxiway	20
6	Apron	10

LEGEND

PAVEMENT EVALUATION TABLES

SEG. NO. - Segment Number (defined by FAA system)

R - Runway
T - Taxiway
A - Apron

PAVE TYPE - Pavement Type

AC - Asphalt ConcreteON - Oiled Native
PCC - Portland Cement Concrete SA - Soiled Asphalt
CS - Chip SealUP - Unpaved
OG - Oiled Gravel PFC - Porous Friction Course

PAVEMENT RATING - Pavement rating based upon condition of surface giving greater emphasis to those pavement conditions needing immediate attention

RECOMMENDED TREATMENT - Surface treatment technique recommended to enhance the life and use of the pavement

TECHNIQUE -	Code	Description
	1	Fog seal
	2	Rejuvenating seal
	3	Slurry seal
	4	Chip seal
	5	Membrane interlayer
	6	2-inch AC overlay
	7	3-inch AC overlay
	8	4-inch AC overlay
	9	Fog seal and chip seal (1 and 4)
	10	2-inch overlay and membrane (5 and 6)
	11	3-inch overlay and membrane (5 and 7)
	12	4-inch overlay and membrane (5 and 8)
	13	Joint sealing
	14	Slab repair - 1%
	15	Slab repair - 5%
	16	Slab repair - 10%
	17	Slab replacement - 1%
	18	Slab replacement - 5%
	19	Slab replacement - 10%
	20	4-inch PCC overlay

UNIT COST - Price per square foot of surface treatment recommended

TOTAL COST - Complete price of surface treatment recommended

WEIGHTED RATING - Rating given to the pavement surface based upon the pavement rating, the airport's regional role, the type of pavement, and use of the pavement (i.e., runway, taxiway, apron)

ORIGINAL OR RECONSTRUCT - Last known date of original or reconstruction of pavement surface

? - Unknown date

LAST OVERLAY

DATE - Year of last overlay
THICK - Thickness of overlay in inches

LAST MAINTENANCE

DATE - Year of last maintenance
TECH - Maintenance technique used other than overlay
1 - Slurry Seal 2 - Chip Seal 3 - Coaltar

SECTION

SURF - Surface thickness in inches
BASE - Base thickness in inches
SUBBASE - Subbase thickness in inches

CONDITION - Condition rating scores determined by the type of surface imperfections listed below:

ROUGH - Roughness of surface (any type of surface)

0 - Smooth
1 - Acceptable
2 - Tolerable
3 - Barely Tolerable
4 - Unacceptable

ALICRK - Alligator cracking (asphalt concrete or chip seal surfaces)

0 - None observed
1 - Acceptable
2 - Tolerable less than 25% of wheel path area
3 - Tolerable greater than 25% of wheel path area and/or Unacceptable less than 5% of wheel path area
4 - Unacceptable greater than 5% of wheel path area

DISINT - Disintegration (Portland Cement Concrete surfaces)

0 - None observed
1 - Acceptable less than 5%
2 - Acceptable greater than 5%
3 - Tolerable in any amount
4 - Unacceptable in any amount

RUTING - Rutting (asphalt concrete and chip seal surfaces)

0 - None observed
1 - Less than 1/4 inch in any amount
2 - Between 1/4 inch and 1/2 inch in less than 25% of wheel path area
3 - Between 1/4 inch and 1/2 inch rutting greater than 25% of wheel path area and/or over 1/2 inch in less than 5% of wheel path area
4 - Over 1/2 inch rutting greater than 5% of wheel path area

RAVLNG - Ravelling (asphalt concrete and chip seal surfaces)

0 - None observed
1 - Acceptable in any amount
2 - Tolerable less than 10% of the surface area
3 - Tolerable greater than 10% of the surface area
4 - Unacceptable in any amount

LACRK - Load-Associated Cracking (Portland Cement Concrete surfaces)

0 - None observed
1 - Occasional corner crack
2 - Occasional longitudinal crack in wheel path area
3 - Patter of "nonworking" corner and longitudinal cracks in wheel path areas
4 - Pattern of "working" corner and longitudinal cracks in wheel path areas

("nonworking" cracks are typical concrete cracks with no visible movement; "working" cracks are concrete cracks with vertical and/or horizontal visible movement)

BLCRK - Block Cracking (asphalt concrete and chip seal surfaces)

0 - None observed
1 - Acceptable in less than 3/8-inch crack width and/or
Tolerable in less than 1/8-inch crack width
2 - Acceptable greater than 3/8-inch crack width and/or
Unacceptable less than 1/8-inch crack width
3 - Tolerable greater than 1/8-inch crack width
4 - Unacceptable greater than 1/8-inch crack width

NLAC - Non-Load-Associated Cracking (Portland Cement Concrete surfaces)

0 - None observed
1 - Up to two hairline cracks per slab less than 25% of area
2 - Up to two hairline cracks per slab greater than 25% of area
and/or one well-defined crack per slab less than 25% of area
3 - One well-defined crack per slab greater than 25% of area and/or
two or more well-defined cracks per slab less than 10% of area
4 - Two or more well-defined cracks per slab greater than 10% of area

SPALING - Spalling (Portland Cement Concrete surfaces)

0 - None observed
1 - Less than 1/4 inch less than 25% of joint or crack
2 - Less than 1/4 inch greater than 25% of joint or crack and/or
between 1/4 and 1/2 inch less than 10% of joint or crack
3 - Between 1/4 and 1/2 inch greater than 10% of joint or crack and/or
over 1/2 inch less than 10% of joint or crack
4 - Over 1/2 inch greater than 10% of joint or crack

DRAIN - Drainage

0 - Good drainage
1 - Small ponding
2 - Moderate ponding
3 - Poor drainage

GLOSSARY

ABOVE GROUND LEVEL (AGL): An elevation datum given in feet above ground level.

AIR CARRIER: A person who undertakes directly by lease, or other arrangement, to engage in air transportation. (FAR 1) (Also see Certificated Route Air Carrier)

AIR CARRIERS: The commercial system of air transportation, consisting of the certificated route air carriers, air taxis (including commuters), supplemental air carriers, commercial operators of large aircraft, and air travel clubs. (FAA Census)

AIR ROUTE TRAFFIC CONTROL CENTER (ARTCC): A facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace, principally during the en route phase of flight. (AIM)

AIR TAXI: A classification of air carriers which directly engage in the air transportation of persons, property, mail, or in any combination of such transportation and which do not directly or indirectly utilize large aircraft (over 30 seats or a maximum payload capacity of more than 7,500 pounds) and do not hold a Certificate of Public Convenience and Necessity or economic authority issued by the Department of Transportation. (Also see commuter air carrier and demand air taxi.) (FAA Census)

AIR TRAFFIC CONTROL (ATC): A service operated by appropriate authority to promote the safe, orderly, and expeditious flow of air traffic. (FAR 1)

AIRPORT TRAFFIC CONTROL TOWER (ATCT): A terminal facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport or on the movement area. (AIM)

AIRCRAFT ACCIDENT: An occurrence associated with the operation of an aircraft which takes place between the time any person boards the aircraft with the intention of flight until such time as all such persons have disembarked, and in which any person suffers death or serious injury as a result of being in or upon the aircraft or by direct contact with the aircraft or anything attached thereto, or in which the aircraft receives substantial damage. (NTSB)

AIRCRAFT OPERATION: The airborne movement of aircraft in controlled or noncontrolled airport terminal areas and about given en route fixes or at other points where counts can be made. There are two types of operations – local and itinerant. (FAA Stats)

AIRCRAFT PARKING LINE LIMIT (APL): A line established by the airport authorities beyond which no part of a parked aircraft should protrude. (Utility AC)

AIRPORT: An area of land or water that is used or intended to be used for the landing and taking off of aircraft, and includes its buildings and facilities, if any. (FAR 1)

AIRPORT ELEVATION: The highest point of an airport's usable runways, measured in feet above mean sea level. (AIM)

AIRPORT HAZARD: Any structure or natural object located on or in the vicinity of a public airport, or any use of land near such airport, that obstructs the airspace required for the flight of aircraft in landing or taking off at the airport or is otherwise hazardous to aircraft landing, taking off, or taxiing at the airport. (Utility AC)

AIRPORT LAYOUT PLAN: A scale drawing of existing and proposed airport facilities, their location on the airport, and the pertinent clearance and dimensional information required to demonstrate conformance with applicable standards.

AIRPORT RADAR SERVICE AREA (ARSA): Regulatory airspace surrounding designated airports wherein FAA Air Traffic Control provides radar vectoring and sequencing on a full-time basis for all IFR and VFR aircraft. (AIM)

AIRPORT REFERENCE POINT: A point established on an airport, having equal relationship to all existing and proposed landing and takeoff areas, and used to geographically locate the airport and for other planning purposes. (Utility AC)

AIRWAY/FEDERAL AIRWAY: A control area or portion thereof established in the form of a corridor, the centerline of which is defined by radio navigational aids. (AIM)

ALERT AREA: A special use airspace which may contain a high volume of pilot training activities or an unusual type of aerial activity, neither of which is hazardous to aircraft. (AIM)

APPROACH LIGHT SYSTEM (ALS): An airport lighting system which provides visual guidance enabling a pilot to align the aircraft with the extended runway centerline during a final approach to landing. Among the specific types of systems are:

- LDIN – Sequenced Flashing Lead-in Lights.
- ODALS – Omnidirectional Approach Light System, a combination of LDIN and REILS.
- SSALR – Simplified Short Approach Light System with Sequenced Flashing Lights. (AIM)

APPROACH SPEED: The recommended speed contained in aircraft manuals used by pilots when making an approach to landing. This speed will vary for different segments of an approach as well as for aircraft weight and configuration. (AIM)

AUTOMATED WEATHER OBSERVING SYSTEM (AWOS): Airport electronic equipment which automatically measures meteorological parameters, reduces and analyzes the data via computer, and broadcasts weather information which can be received on aircraft radios.

AUTOMATIC DIRECTION FINDER (ADF): An aircraft radio navigation system which senses and indicates the direction to a nondirectional radio beacon ground transmitter. (AIM)

AUTOMATIC TERMINAL INFORMATION SERVICE (ATIS): The continuous broadcast of recorded noncontrol information in selected terminal areas. (AIM)

BACK COURSE APPROACH: A nonprecision instrument approach utilizing the rearward projection of the ILS localizer beam.

BASED AIRCRAFT: Aircraft stationed at an airport on a long-term basis.

BUILDING RESTRICTION LINE (BRL): A line established with respect to the runway centerline to assure that structures will not project above the imaginary surfaces required by FAR Part 77.

CEILING: Height above the earth's surface to the lowest layer of clouds or obscuring phenomena. (AIM)

CERTIFICATED ROUTE AIR CARRIER: An air carrier holding a Certificate of Public Convenience and Necessity issued by the Department of Transportation authorizing the performance of scheduled service over specified routes, and a limited amount of nonscheduled service. (FAA Census)

CIRCLING APPROACH/CIRCLE-TO-LAND MANEUVER: A maneuver initiated by the pilot to align the aircraft with a runway for landing when a straight-in landing from an instrument approach is not possible or not desirable. (AIM)

COMMERCIAL OPERATOR: A person who, for compensation or hire, engages in the carriage by aircraft in air commerce of persons or property, other than as an air carrier. (FAR 1)

COMPASS LOCATOR: A low power, low or medium frequency radio beacon installed at the site of the outer or middle marker of an instrument landing system (ILS). (AIM)

COMPASS ROSE: A circle, graduated in degrees, printed on some charts or marked on the ground at an airport. It is used as a reference to either true or magnetic direction. (AIM)

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL): The noise rating adopted by the State of California for measurement of airport noise. It represents the average daytime noise level during a 24-hour day, measured in decibels and adjusted to an equivalent level to account for the lower tolerance of people to noise during evening and nighttime periods.

COMMUTER AIR CARRIER: An air taxi operator which performs at least five round trips per week between two or more points and publishes flight schedules which specify the times, days of the week and places between which such flights are performed. (FAA Census)

CONTROLLED AIRSPACE: Any of several types of airspace within which some or all aircraft may be subject to air traffic control. (FAR 1)

CONTROL ZONE: Controlled airspace surrounding one or more airports, normally a circular area with a radius of 5 statute miles plus extensions to include instrument arrival and departure paths. Most control zones surround airports with air traffic control towers and are in effect only for the hours the tower is operational.

DEMAND AIR TAXI: Use of an aircraft operating under Federal Aviation Regulations, Part 135, passenger and cargo operations, including charter and excluding commuter air carrier. (FAA Census)

DISPLACED THRESHOLD: A threshold that is located at a point on the runway other than the designated beginning of the runway. (See Threshold) (AIM)

DISTANCE MEASURING EQUIPMENT (DME): Equipment (airborne and ground) used to measure, in nautical miles, the slant range distance of an aircraft from the DME navigational aid. (AIM)

FAR PART 77: The part of the Federal Aviation Regulations which deals with objects affecting navigable airspace.

FAR PART 77 SURFACES: Imaginary surfaces established with relation to each runway of an airport. There are five types of surfaces: (1) primary; (2) approach; (3) transitional; (4) horizontal; and (5) conical.

FEDERAL AVIATION ADMINISTRATION (FAA): The United States government agency which is responsible for insuring the safe and efficient use of the nation's airspace.

FIXED BASE OPERATOR (FBO): A business operating at an airport that provides aircraft services to the general public, including but not limited to sale of fuel and oil; aircraft sales, rental, maintenance, and repair; parking and tiedown or storage of aircraft; flight training; air taxi/charter operations; and specialty services, such as instrument and avionics maintenance, painting, overhaul, aerial application, aerial photography, aerial hoists, or pipeline patrol.

FLIGHT SERVICE STATION (FSS): FAA facilities which provide pilot briefings on weather, airports, altitudes, routes, and other flight planning information.

GENERAL AVIATION: That portion of civil aviation which encompasses all facets of aviation except air carriers. (FAA Stats)

GLIDE SLOPE: An electronic signal radiated by a component of an ILS to provide descent path guidance to approaching aircraft.

HELIPAD: A small, designated area, usually with a prepared surface, on a heliport, airport, landing/takeoff area, apron/ramp, or movement area used for takeoff, landing, or parking of helicopters. (AIM)

INSTRUMENT APPROACH PROCEDURE: A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually. It is prescribed and approved for a specific airport by competent authority. (AIM)

INSTRUMENT FLIGHT RULES (IFR): Rules governing the procedures for conducting instrument flight. Generally, IFR applies when meteorological conditions with a ceiling below 1,000 feet and visibility less than 3 miles prevail. (AIM)

INSTRUMENT LANDING SYSTEM (ILS): A precision instrument approach system which normally consists of the following electronic components and visual aids: (1) Localizer; (2) Glide Slope; (3) Outer Marker; (4) Middle Marker; (5) Approach Lights. (AIM)

INSTRUMENT OPERATION: An aircraft operation in accordance with an IFR flight plan or an operation where IFR separation between aircraft is provided by a terminal control facility. (FAA ATA)

INSTRUMENT RUNWAY: A runway equipped with electronic and visual navigation aids for which a precision or nonprecision approach procedure having straight-in landing minimums has been approved. (AIM)

ITINERANT OPERATION: An arrival or departure performed by an aircraft from or to a point beyond the local airport area.

LARGE AIRCRAFT: An aircraft of more than 12,500 pounds maximum certificated takeoff weight. (FAR 1)

LIMITED REMOTE COMMUNICATIONS OUTLET (LRCO): An unmanned, remote air/ground communications facility which may be associated with a VOR. It is capable only of receiving communications and relies on a VOR or a remote transmitter for full capability.

LOCALIZER (LOC): The component of an ILS which provides course guidance to the runway. (AIM)

LOCAL OPERATION: An arrival or departure performed by an aircraft: (1) operating in the traffic pattern, (2) known to be departing or arriving from flight in local practice areas, or (3) executing practice instrument approaches at the airport. (FAA ATA)

MARKER BEACON (MB): The component of an ILS which informs pilots that they are at a significant point on the approach course.

MEAN SEA LEVEL (MSL): An elevation datum given in feet above mean sea level.

MICROWAVE LANDING SYSTEM (MLS): A precision instrument approach system providing a function similar to an ILS, but operating in the microwave spectrum. It normally consists of three components: azimuth station, elevation station, and precision distance measuring equipment.

MILITARY OPERATIONS AREA (MOA): A type of special use airspace established to separate certain military activities from IFR traffic and to identify for VFR traffic where these activities are conducted.

MINIMUM DESCENT ALTITUDE (MDA): The lowest altitude, expressed in feet above mean sea level, to which descent is authorized on final approach or during circle-to-land maneuvering in execution of a standard instrument approach procedure where no electronic glide slope is provided. (FAR 1)

MISSED APPROACH: A maneuver conducted by a pilot when an instrument approach cannot be completed to a landing. (AIM)

NAVIGATIONAL AID/NAVAID: Any visual or electronic device airborne or on the surface which provides point-to-point guidance information or position data to aircraft in flight. (AIM)

NONDIRECTIONAL BEACON (NDB): A radio beacon transmitting nondirectional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and "home" on or track to or from the station. (AIM)

NONPRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which no electronic glide slope is provided. (FAR 1)

NONPRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing air navigation facilities, with only horizontal guidance, or area-type navigation equipment for which a straight-in nonprecision instrument approach procedure has been approved or planned, and no precision approach facility or procedure is planned. (Utility AC)

OBSTACLE: An existing object, object of natural growth, or terrain, at a fixed geographical location, or which may be expected at a fixed location within a prescribed area, with reference to which vertical clearance is or must be provided during flight operation. (AIM)

OBSTRUCTION: An object, including a mobile object, which penetrates an imaginary surface described in FAR Part 77.

OUTER MARKER: A marker beacon at or near the glide slope intercept position of an ILS approach. (AIM)

PRECISION APPROACH PATH INDICATOR (PAPI): An airport landing aid similar to a VASI, but which has light units installed in a single row rather than two rows.

PRECISION APPROACH PROCEDURE: A standard instrument approach procedure in which an electronic glide slope is provided. (FAR 1)

PRECISION INSTRUMENT RUNWAY: A runway with an instrument approach procedure utilizing an instrument landing system (ILS), microwave landing system (MLS), or precision approach radar (PAR). (Utility AC)

REMOTE COMMUNICATIONS AIR/GROUND FACILITY (RCAG): An unmanned VHF/UHF transmitter/receiver facility which is used to expand ARTCC air/ground communications coverage and to facilitate direct contact between pilots and controllers. (AIM)

REMOTE COMMUNICATIONS OUTLET (RCO) AND REMOTE TRANSMITTER/RECEIVER (RTR): An unmanned communications facility remotely controlled by air traffic personnel. RCO's serve FSS's. RTR's serve terminal ATC facilities. (AIM)

RESTRICTED AREA: Designated airspace within which the flight of aircraft, while not wholly prohibited, is subject to restriction. (FAR 1)

RUNWAY CLEAR ZONE: A trapezoidal area at ground level, under the control of the airport authorities, for the purpose of protecting the safety of approaches and keeping the area clear of the congregation of people. The runway clear zone begins at the end of each primary surface and is centered upon the extended runway centerline. (Utility AC)

RUNWAY EDGE LIGHTS: Lights used to define the lateral limits of a runway. Specific types include:

- HIRL – High-Intensity Runway Lights.
- MIRL – Medium-Intensity Runway Lights.

RUNWAY END IDENTIFIER LIGHTS (REIL): Two synchronized flashing lights, one on each side of the runway threshold, which provide a pilot with a rapid and positive visual identification of the approach end of a particular runway. (AIM)

RUNWAY SAFETY AREA: A cleared, drained, graded, and preferably turfed area symmetrically located about the runway which, under normal conditions, is capable of supporting snow removal, fire fighting, and rescue equipment and of accommodating the occasional passage of aircraft without causing major damage to the aircraft.

SMALL AIRCRAFT: An aircraft of 12,500 pounds or less maximum certificated takeoff weight. (FAR 1)

SPECIAL USE AIRSPACE: Airspace of defined horizontal and vertical dimensions wherein activities must be confined because of their nature and/or wherein limitations may be imposed upon aircraft operations that are not a part of those activities. (AIM)

STANDARD INSTRUMENT DEPARTURE (SID): A preplanned instrument flight rules (IFR) air traffic control departure procedure printed for pilot use in graphic and/or textual form. SID's provide transition from the terminal to the appropriate en route structure. (AIM)

STANDARD TERMINAL ARRIVAL ROUTE (STAR): A preplanned instrument flight rule (IFR) air traffic control arrival route published for pilot use in graphic and/or textual form. STARs provide transition from the en route structure to an outer fix or an instrument approach fix/arrival waypoint in the terminal area. (AIM)

STOPWAY: An area beyond the takeoff runway, no less wide than the runway and centered upon the extended centerline of the runway, able to support the airplane during an aborted takeoff, without causing structural damage to the airplane, and designated by the airport authorities for use in decelerating the airplane during an aborted takeoff. (FAR 1)

STRAIGHT-IN INSTRUMENT APPROACH: An instrument approach wherein final approach is begun without first having executed a procedure turn; it is not necessarily completed with a straight-in landing or made to straight-in landing weather minimums. (AIM)

TAXILANE: The portion of the aircraft parking area used for access between taxiways, aircraft parking positions, hangars, storage facilities, etc. (Utility AC)

TAXIWAY: A defined path, from one part of an airport to another, selected or prepared for the taxiing of aircraft. (Utility AC)

TERMINAL CONTROL AREA (TCA): Controlled airspace extending upward from the surface or higher to specified altitudes, within which all aircraft are subject to operating rules and pilot and equipment requirements specified in FAR Part 91. (AIM)

TERMINAL INSTRUMENT PROCEDURES (TERPS): Procedures for instrument approach and departure of aircraft to and from civil and military airports. There are four types of terminal instrument procedures: precision approach, nonprecision approach, circling, and departure.

TERMINAL RADAR SERVICE AREA (TRSA): Airspace surrounding designated airports wherein ATC provides radar vectoring, sequencing, and separation on a full-time basis for all IFR and participating VFR aircraft. (AIM)

THRESHOLD: The beginning of that portion of the runway usable for landing. (AIM) (Also see Displaced Threshold)

TOUCH-AND-GO: A practice maneuver consisting of a landing and a takeoff performed in one continuous movement. A touch-and-go is defined as two operations.

TRAFFIC PATTERN: The traffic flow that is prescribed for aircraft landing at, taxiing on, or taking off from an airport. The components of a typical traffic pattern are upwind leg, crosswind leg, downwind leg, base leg, and final approach. (AIM)

TRANSIENT AIRCRAFT: Aircraft not based at the airport.

TRANSMISSOMETER: An apparatus used to measure runway visibility on an ILS runway.

TRANSPORT AIRPORT: An airport designed, constructed, and maintained to serve airplanes having approach speeds of 121 knots or more. (Utility AC)

UNICOM (Aeronautical Advisory Station): A nongovernment air/ground radio communication facility which may provide airport information at certain airports. (AIM)

UTILITY AIRPORT: An airport designed, constructed, and maintained to serve airplanes having approach speeds less than 121 knots. (Utility AC)

VERY-HIGH-FREQUENCY OMNIDIRECTIONAL RANGE (VOR): The standard navigational aid used throughout the airway system to provide bearing information to aircraft. When combined with Tactical Air Navigation (TACAN) the facility, called VORTAC, provides distance as well as bearing information.

VISUAL APPROACH SLOPE INDICATOR (VASI): An airport landing aid which provides a pilot with visual descent (approach slope) guidance while on approach to landing. Also see PAPI.

VISUAL FLIGHT RULES (VFR): Rules that govern the procedures for conducting flight under visual conditions. VFR applies when meteorological conditions are equal to or greater than the specified minimum – generally, a 1,000-foot ceiling and 3-mile visibility.

VISUAL GLIDE SLOPE INDICATOR (VGSI): A generic term for the group of airport visual landing aids which includes Visual Approach Slope Indicators (VASI), Precision Approach Path Indicators (PAPI), and Pulsed Light Approach Slope Indicators (PLASI). When FAA funding pays for this equipment, whichever type recieves the lowest bid price will be installed unless the airport owner wishes to pay the difference for a more expensive unit.

VISUAL RUNWAY: A runway intended solely for the operation of aircraft using visual approach procedures, with no straight-in instrument approach procedure and no instrument designation indicated on an FAA-approved airport layout plan. (Utility AC)

WARNING AREA: Airspace which may contain hazards to nonparticipating aircraft in international airspace. (AIM)

REFERENCES

FAR 1: Federal Aviation Regulations Part 1, Definitions and Abbreviations. (1974)

AIM: Airman's Information Manual, Pilot/Controller Glossary. (1988)

Utility AC: Federal Aviation Administration. *Utility Airports – Air Access to National Transportation.* Advisory Circular 150/5300-4B. (1987)

FAA ATA: Federal Aviation Administration. *Air Traffic Activity.* (1986)

FAA Census: Federal Aviation Administration. *Census of U.S. Civil Aircraft.* (1986)

FAA Stats: Federal Aviation Administration. *Statistical Handbook of Aviation.* (1984)

NTSB: National Transportation Safety Board.